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Vol. I

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1936

No. 36

SAMUEL B. SMITH, PETITIONER,

vs.

JAMES MANUFACTURING COMPANY AND ELMIRA HATCHERIES, INCORPORATED

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

PETITION FOR CERTIORARI FILED APRIL 21, 1936.

CERTIORARI GRANTED MAY 25, 1936.

SUPREME COURT OF THE UNITED STATES

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[fol. 1]

IN THE UNITED STATES DISTRICT COURT, WESTERN DISTRICT OF NEW YORK

In Equity. No. 253

SAMUEL B. SMITH, Plaintiff,

vs.

JAMES MANUFACTURING COMPANY, Defendant

BILL OF COMPLAINT—Filed May 12, 1930

To the Honorable the Judges of the United States District Court for the Western District of New York:

Plaintiff represents and states as follows:

1. That the plaintiff, Samuel B. Smith, is a citizen of the United States and a resident of Cleveland, Ohio.

2. Upon information and belief that the defendant, the James Manufacturing Company, is a corporation of Wisconsin, and has and maintains a regularly established office and place of business at Elmira, Chemung County, New York, at which place it is engaged and doing business in the manufacture and/or sale of incubators for the hatching of eggs.

3. The jurisdiction of this Court depends upon the fact that this suit is one arising under the patent laws of the United States.

[fol. 2] 4. Upon information and belief that prior to October 26, 1916, the plaintiff, Samuel B. Smith, was the first, original and sole inventor of certain new and useful improvements in Incubators, not known or used by others before his invention or discovery thereof, not patented or described in any printed publication in this or any foreign country prior to his invention thereof or more than two years prior to October 26, 1916, not in public use or on sale in this country for more than two years prior to said date, not abandoned, and not patented by Samuel B. Smith or his legal representatives or assigns upon an application filed more than twelve months prior to said date.

5. On October 26, 1916, the plaintiff, Samuel B. Smith, filed in the United States Patent Office an application for Letters Patent of the United States for said improvement.

6. That prior to April 16, 1918, Samuel B. Smith assigned the right, title and interest in and to the said invention and in and to any United States patent to issue thereon to The Buckeye Incubator Company, a corporation of Ohio, and that after due proceedings upon the said application for patent there was issued to The Buckeye Incubator Company, aforesaid, United States Letters Patent No. 1,262,860 on April 16, 1918, whereby the exclusive right of making, using and selling the said invention and improvements throughout the United States for the term of said patent was granted to The Buckeye Incubator Company, aforesaid, its successors or assigns, as will more fully appear from the original or duly certified copies of the said patent [fol. 3] and assignment, to be produced in Court herein.

7. That under date of April 29, 1927, The Buckeye Incubator Company, aforesaid, being then the owner of the title in and to the aforesaid Letters Patent, did sell, assign and transfer to the plaintiff, Samuel B. Smith, his heirs and assigns, the right, title and interest in and to the said Letters Patent as will more fully appear from the original assignment or duly certified copy thereof to be produced in Court herein.

8. That the plaintiff and his predecessor in title, The Buckeye Incubator Company, have been at all times the sole and exclusive owners of the said patent.

9. That the said patented invention has proven to be of very great value, that the plaintiff has expended large sums of money in the manufacture and sale of incubators embodying the invention thereof, that the incubators so manufactured and sold have acquired a high reputation and utility and have proven to possess superior functions and qualities over other incubators, that the said patent has been widely recognized and respected, and that the validity of said patent has been established in litigations arising thereunder in various Circuit Courts of Appeal and District Courts of the United States.

10. That incubators manufactured and sold by the plaintiff have been marked "Patented" together with the date

and number of the patent aforesaid as required by the Statutes of the United States, and that in addition the de-
[fol. 4] fendant herein has been duly notified in writing of the patent aforesaid and of its infringement thereof.

11. Upon information and belief that the defendant prior to and not more than six years before the filing of the Bill of Complaint herein, has been engaged at Elmira, New York, in the manufacture and/or sale of incubators for the hatching of eggs, which said incubators embody the invention of said patent No. 1,262,860, and particularly claim 5 thereof, and is selling or offering for sale such incubators, thereby inciting and contributing toward the infringement by others of the process of hatching eggs as set forth in claims 1, 2 and 3 of the said patent, and is threatening to continue such acts, whereby the rights of the plaintiff as secured by the said patent are infringed, all without the license or consent of the plaintiff.

12. That by reason of the infringement complained of herein, the plaintiff has suffered and is suffering irreparable loss and damage and the defendant has realized profits and gains which of right belong to the plaintiff, and will continue to do so unless restrained by this Court.

Wherefore, the plaintiff prays:

1. That a writ of subpœna may issue out of this Court directed to the defendant, the James Manufacturing Company, commanding it to appear and answer all and singular the matters and things herein complained of, but not under oath, an answer under oath being expressly waived.

2. That temporary and permanent injunctions be issued out of this Court addressed to the defendant, the James
[fol. 5] Manufacturing Company, and its workmen, employees, solicitors, agents, attorneys and others claiming or holding under the defendant, enjoining and restraining them from in any manner directly or indirectly infringing upon or contributing to the infringement of the patent sued upon herein.

3. That the defendant be required to account for and pay to the plaintiff all the gains and profits acquired by it and recompense the plaintiff for the damages sustained by

the plaintiff by reason of the infringement complained of herein.

4. That the defendant pay the costs of this suit, and that such other further and equitable relief be granted to the plaintiff as shall be found necessary or proper.

Samuel B. Smith, by Charles W. Parker, His Solicitor. Charles W. Parker, A. L. Ely, of Counsel.

Duly sworn to by Samuel B. Smith. Jurat omitted in printing.

[fol. 6] IN THE UNITED STATES DISTRICT COURT

[Title omitted]

ANSWER—Filed July 11, 1930

The above named defendant, James Manufacturing Company, by its attorneys, for answer to the Bill of Complaint in the above entitled cause, says:

[fol. 7] 1. Defendant admits that it is a Wisconsin Corporation. Its principal office and place of business is at Fort Atkinson, Jefferson County, Wisconsin, at which place its incubators are manufactured. Defendant admits that it has a regularly established office and place of business at Elmira, New York, and that some of its incubators are sold or delivered to purchasers from that place, but denies that any incubators are being made, or have been made, at Elmira.

2. Defendant admits the grant of Letters Patent of the United States to The Buckeye Incubator Company numbered 1,262,860 and dated April 16, 1918, on an application filed by the plaintiff.

3. Defendant is without knowledge as to whether the subject matter of said Letters Patent had been patented or caused to be patented by the plaintiff on an application filed in a foreign country more than twelve months prior to his application for said patent in this country.

4. Defendant is without knowledge as to whether The Buckeye Incubator Company, aforesaid, ever sold, assigned or transferred to the plaintiff, or to his heirs or assigns, any right, title or interest in and to said Letters Patent.

5. Defendant is without knowledge as to whether the plaintiff, and/or The Buckeye Incubator Company, have been at all times, or whether they, or either of them, now are the sole or exclusive owners of said Letters Patent, or as to whether the plaintiff is the owner of any part thereof.

[fol. 8] 6. Defendant is without knowledge as to whether all incubators manufactured and sold by the plaintiff and/or by others acting under its authority, as set forth in the Bill of Complaint, have been marked patented, together with the date and number of said Letters Patent, and is without knowledge as to whether the plaintiff has in any way conformed to the requirements of the Statutes as to the marking of its incubators.

7. Defendant admits that on or about the 17th day of April, 1930, it received a notice of said Letters Patent from Messrs. Ely and Barrow, reciting that they were acting for the plaintiff and charging that the incubators made and sold by defendant were believed to infringe some of the claims thereof, but without specifying which claims were believed to have been infringed. Defendant says that before it could investigate or place itself in a position to act intelligently with respect to said charge, to-wit,—on or about the 13th day of May, 1930, it received a further notice from them stating that a suit was being commenced, a Bill of Complaint having been prepared and forwarded to the Western District of New York for service; that prior to the commencement of this suit defendant was given no other notice and no opportunity to take any intelligent action respecting plaintiff's charge of infringement.

8. Defendant denies all allegations contained in paragraph numbered four of the Bill of Complaint with reference to prior knowledge and use of the alleged improvements set forth in said Letters Patent; the existence of [fol. 9] prior patents therefor; the description thereof in printed publications; the public use; the placing on sale; the patenting or published description thereof more than two years prior to the plaintiff's said application; and the abandonment of said alleged invention.

9. Defendant denies that any invention of the plaintiff is disclosed or covered by, or claimed in said Letters Patent, and denies that anything embodying an invention made

by the plaintiff has ever been made, used, or sold by the defendant.

10. Defendant denies that it has ever been engaged in the manufacture, sale or use of incubators which embody any invention of said Letters Patent numbered 1,262,860 or purporting to be described and claimed therein, and denies that it has in any way infringed, or incited or contributed to any infringement by others, of the alleged method of hatching eggs as set forth in claims 1 or 2 or 3 of said Letters Patent, and further denies that it has ever made or sold or used, or contributed to the manufacture, sale or use of incubators made in accordance with claim 5 of said Letters Patent, and denies that it has ever intended or threatened to infringe said Letters Patent.

11. Defendant is informed and admits that the plaintiff has expended large sums of money in the manufacture and sale of incubators made in general accordance with the drawings and specification of said Letters Patent, but defendant denies that the alleged invention claimed [fol. 10] thereby has proven to be of value and denies that such incubators have acquired a high reputation or recognition of utility except as to features common to other incubators designed and marketed prior to the said alleged invention of the plaintiff, and denies that the plaintiff's said incubators possess superior qualities and/or functions over other incubators previously designed and marketed as aforesaid, and denies that said patent has been widely recognized and respected. Defendant is informed and believes and therefore avers that said Letters Patent have been generally disregarded and believed to be either invalid or limited to the precise features shown and described therein. Defendant is without knowledge as to profits made by the plaintiff from the manufacture and sale of incubators, as alleged in the Bill of Complaint but defendant is informed and verily believes and therefore says that said The Buckeye Incubator Company has been adjudicated a bankrupt, that a receiver in bankruptcy was duly appointed and that its assets have been sold to a purchaser who intends to continue the business of manufacturing incubators but not under any authority derived from the plaintiff.

12. Defendant is informed and admits that the plaintiff has instituted suits in various District Courts of the United States charging others with having infringed said Letters Patent, but denies that the validity thereof has been established by any decrees except as against servile imitations by persons who had also been guilty of inequitable conduct, and as against persons who had been guilty of [fol. 11] unfair competitive tactics whereby they had forfeited their standing in Court. Defendant is informed and believes and therefore avers that except for such decrees and others obtained by consent or settlement the plaintiff has been unsuccessful in litigation, and that in all such suits heretofore tried, contesting defendants who were not servile imitators and not guilty of unfair competition, were successful in their defenses, and that decrees have been entered in such cases, construing and limiting the claims of said Letters Patent to substantially the exact method and structure shown and described therein, and to a method and a structure not used by this defendant.

Further answering, defendant says:

13. That the alleged method purporting to be patented in and by the claims numbered 1, 2 and 3 of the plaintiff's said Letters Patent numbered 1,262,860 is not patentable under the laws of the United States for the reason that said claims set forth and attempt to monopolize merely the functions of the plaintiff's incubator as shown in the drawings and described in the specification of said patent.

14. That the alleged method as set forth in the claims numbered 1, 2 and 3 of the plaintiff's said patent and in each of them, is limited to the functions and mode of operation which the plaintiff's incubator as set forth in claim 5 of said patent is intended and designed to perform and that the incubator set forth in said claim 5 is essential to said mode of operation and to the performance of said functions; that in defendant's incubators such a mode of [fol. 12] operation is not possible and such functions are not and cannot be performed in the manner set forth in said claims 1, 2 and 3, or in any of them, and that therefore, said defendant's incubator is not equivalent for the plaintiff's incubator as set forth in his said patent in suit and is not an infringement of said Letters Patent.

15. Defendant is informed and believes and therefore avers that in the course of the prosecution in the United States Patent Office of the plaintiff's application for the Letters Patent in suit numbered 1,262,860 such proceedings were had and such representations, admissions, recantations and disclaimers made in behalf of the plaintiff and such interpretations of the claims involved in this suit were made in his behalf and for the purpose of procuring the grant of said Letters Patent, that the plaintiff became and now is estopped to assert that such claims cover or monopolize or patent the subject matter of any incubator made, sold or used by defendant.

16. That in view of the state of the art existing prior to the alleged invention by Samuel B. Smith of the subject matter of said Letters Patent No. 1,262,860 the said patent, if valid, must be construed and limited to the precise method and structure disclosed in the drawings and description of said Letters Patent and that none of the claims of said Letters Patent cover or were intended to cover any incubator sold by the defendant and that none of the incubators made and sold by the defendant are embraced within the claimed subject matter of said Letters Patent but that defendant's incubators and each of them [fol. 13] are different in structure and design and are capable of no mode of operation or method invented by the plaintiff, and that defendant's incubators are not either in structure or in method of use an equivalent for or an embodiment of anything invented by the plaintiff or which the plaintiff has any lawful right to monopolize in and by the patent in suit.

17. Defendant is informed and believes and therefore avers that the claims 1, 2, 3 and 5 of the patent in suit numbered 1,262,860 have been construed and limited by judicial interpretation and adjudication in suits against other manufacturers of incubators and that, as so construed and limited, nothing contained in defendants' incubators or in any mode of operation thereof of which the same are capable, is an infringement of said claims or of any of them, or of said Letters Patent.

18. Defendant is informed and believes and therefore avers that said alleged invention purporting to be patented in and by said Letters Patent numbered 1,262,860 was

abandoned by said Samuel B. Smith, by the manufacture and public use of such incubators for purposes other than experimentation, for a period of more than two years prior to the filing of his said application.

19. This defendant further says that said Letters Patent are ineffective to claim or monopolize anything made by this defendant for the reason that the same as to all features and combinations of features disclosed in said Letters Patent and also found in defendant's incubator are mere [fol. 14] aggregations of features and elements and combinations of features and of elements common to the prior art and known to and used by manufacturers of incubators generaly prior to the alleged invention thereof by the plaintiff and more than two years prior to his said application and that no invention was required to so aggregate them in a single incubator and no new result was obtained by so doing.

Further answering, this defendant says:

20. Defendant is informed and believes and therefore avers that the Letters Patent in suit numbered 1,262,860 are null and void and have no force and effect whatsoever for the reason that the alleged invention or improvement described and attempted to be claimed and monopolized in and by said Letters Patent and every material and substantial part thereof, was shown and described and patented and shown disclosed and described in printed publications prior to the alleged invention or discovery thereof by said Samuel B. Smith in and by the following specified Letters Patents and publications, to-wit:

United States Letters Patent

Number	Date	Inventor	Title
3,019	Mar. 30, 1843	Napoleon E. Guerin...	Egg Hatching Apparatus
240,004	Apr. 12, 1881	Paul H. Bate.....	Refrigerator
535,961	Feb. 9, 1896	Edw. G. Renwich.....	Incubator
547,946	Aug. 24, 1896	Jacob K. Meschter....	Incubator
540,107	May 28, 1895	Norman McAslan.....	Incubator
553,723	Jan. 28, 1896	Josiah K. Proctor.....	Apparatus for Ordering Tobacco
[fol. 15]			
559,260	Apr. 28, 1896	John T. Butts.....	Incubator
605,806	June 14, 1898	Joseph McCreery.....	Ventilating System
656,760	Aug. 28, 1900	Granville T. Woods....	Incubator

United States Letters Patent—Continued

Number	Date	Inventor	Title
691,837	Jan. 28, 1902	Virgil S. Bell.....	Incubator
780,912	Jan. 24, 1905	Wm. H. Phillips.....	Incubator
789,719	May 16, 1905	John H. Day.....	Incubator
828,181	Aug. 7, 1906	Geo. H. Boyd.....	Incubator
843,909	Feb. 12, 1907	F. M. Peters et al.....	Atmosphere Reg. System
891,019	June 16, 1908	Luigi Verna	Drying Room
917,483	Apr. 6, 1909	C. C. Peck.....	Automotic Fan System, etc.
951,660	Mar. 8, 1910	Wm. Miller	Machine for Treating Tobacco
1,137,752	May 4, 1915	Geo. E. Goldstein.....	Apparatus for Curing, etc.
1,165,958	Dec. 28, 1915	Thos. B. Freas.....	Heating System
1,205,445	Nov. 21, 1916	Roy F. Fullington.....	Incubator Attachment
10,288 (German)	(British) 1887	John Gardner.....	Improvements in and relating to incubators
155,917	Nov. 11, 1904	E. Stulik	Incubator

Publications

"The Dollar Hen" by Milo Hastings, Published 1909 by The Arcadia Press, New York City, Pages 77 to 107, inclusive.

"Poultry Culture", Topeka, Kansas, Issue of February, 1912, Article entitled "The Mammoth Incubator Outmammothed."

"Boston Sunday Globe", Boston, Mass., Issue of November 10, 1912, Article entitled "Indoor Chicken Factories."

[fol. 16] "Technical World", Chicago, Ill., Issue of April, 1933, Article entitled "Hatching Chickens by Wholesale".

And by various other prior patents and publications not now known to this defendant but which this defendant prays leave to insert in this answer by suitable amendment when ascertained.

21. Defendant is informed and believes and therefore avers that said Letters Patent numbered 1,262,860 are null and void and have no force and effect because in this country, prior to any date of the alleged invention thereof by Samuel B. Smith and for more than two years prior to the date of said application, devices, towit, incubators embody-

ing the alleged invention and every substantial and material part thereof were manufactured, placed on sale, sold and/or publicly used by the persons and at their places of address mentioned in the patents and publications listed in the foregoing paragraph numbered 20 hereof and by the following persons whose names and addresses are hereby given as follows, to-wit:

Walter B. Davis, and Milo Hastings, at Kings Highway & 23rd St., Brooklyn, New York.

John Lieber, and Milo Hastings, at Muskogee, Oklahoma.

E. T. Powers, and Milo Hastings, at Port O'Connor, Texas.

[fol. 17] Chas. A. Cyphers, at Philadelphia, Pa. Stroudsburg, Pa.

Rolla Lawry, at Pacific, Mo.

And by various other persons whose names and addresses are not now known to defendant but which it prays leave to give and mention in this answer by amendment hereto, when ascertained.

22. Defendant is informed and believes and therefore avers that said Samuel B. Smith was not the first inventor of anything embodied in defendant's incubator nor of any method of use practiced or caused or intended by the defendant to be practiced but that each and all features of method or of structure employed by defendant and also disclosed in said Letters Patent 1,262,860 were invented, perfected, discovered and/or designed by each of the several patentees and persons above named in paragraphs numbered 20 and 21 hereof, at their respective addresses as given in their said patents, and set opposite their respective names in paragraph 21, all of whom were each continuously diligent in adapting and perfecting his incubators embodying such improvements or inventions and in reducing the same to practice from a date prior to any date of the alleged invention thereof by Samuel B. Smith and prior to any date following which said Samuel B. Smith was diligent in the completion of his alleged invention and that said Letters Patent are therefore ineffective to lawfully claim and monopolize any method or structure used by the defendant or intended or caused by the defendant to be used.

[fol. 18] 23. Defendant further says that said Letters Patent are null and void and ineffective to lawfully claim and monopolize any method or structure used by the defendant for the reason that the plaintiff failed to comply with the Statutes in such case made and provided, in that the written description of said alleged invention and of the manner and process of making, constructing and using it was not set forth in the plaintiffs application for said Letters Patent and is not set forth in said Letters Patent in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains or with which it is most nearly connected, to make, construct and use the same, and the alleged principle thereof and the best contemplated mode of applying that principle was not explained in the plaintiff's said application and is not explained in said Letters Patent so as to distinguish the alleged invention from other inventions, and that said application did not, and said Letters Patent do not, particularly point out and/or distinctly claim in said claims 1, 2, 3 and 5 thereof, or in any of them, the part, improvement or combination of parts which the plaintiff claimed or now claims as his invention or discovery.

24. Defendant further says that all elements, features, and combinations of features common to the incubator disclosed in the plaintiff's said patent and to this defendant's incubators, are also common to the incubators disclosed in the prior patents and publications aforesaid and prior to the said alleged invention of the plaintiff were commonly known to and used by the public generally and are not and [fol. 19] cannot lawfully be covered or monopolized by said Letters Patent numbered 1,262,860.

Wherefore the defendant avers that the plaintiff is entitled to no relief whatever and prays that the Bill of Complaint be dismissed, with costs to be taxed against the plaintiff.

Dated July 11, 1930.

James Manufacturing Co., by John S. Powers, Harold I. Popp, Defendant's Solicitors. S. L. Wheeler, W. G. Wheeler, per S. L. W. Leverett C. Wheeler, of Counsel for Defendant.

IN THE UNITED STATES DISTRICT COURT

[Title omitted]

AMENDED ANSWER—Filed September 17, 1932

The above named defendant, James Manufacturing Company, by its attorneys, for answer to the Bill of Complaint [fol. 20] in the above entitled cause, says:

1. Defendant admits that it is a Wisconsin corporation. Its principal office and place of business *it as* Fort Atkinson, Jefferson County, Wisconsin, at which place its incubators are manufactured. Defendant admits that it has a regularly established office and place of business at Elmira, New York, and that some of its incubators are sold or delivered to purchasers from that place, but denies that any incubators are being made, or have been made, at Elmira.

2. Defendant admits the grant of Letters Patent of the United States to The Buckeye Incubator Company numbered 1,262,860 and dated April 16, 1918, on an application filed by the plaintiff.

3. Defendant is without knowledge as to whether the subject matter of said Letters Patent had been patented or caused to be patented by the plaintiff on an application filed in a foreign country more than twelve months prior to his application for said patent in this country.

4. Defendant is without knowledge as to whether The Buckeye Incubator Company, aforesaid, ever sold, assigned or transferred to the plaintiff, or to his heirs or assigns, any right, title or interest in and to said Letters Patent.

5. Defendant is without knowledge as to whether the plaintiff, and/or The Buckeye Incubator Company, have [fol. 21] been at all times, or whether they, or either of them, now are the sole or exclusive owners of said Letters Patent, or as to whether the plaintiff is the owner of any part thereof.

6. Defendant is without knowledge as to whether all incubators manufactured and sold by the plaintiff and/or by others acting under its authority, as set forth in the Bill of Complaint, have been marked patented, together with the

date and numbers of said Letters Patent, and is without knowledge as to whether the plaintiff has in any way conformed to the requirements of the Statutes as to the marking of its incubators.

7. Defendant admits that on or about the 17th day of April, 1930, it received a notice of said Letters Patent from Messrs. Ely and Barrow, reciting that they were acting for the plaintiff and charging that the incubators made and sold by defendant were believed to infringe some of the claims thereof, but without specifying which claims were believed to have been infringed. Defendant says that before it could investigate or place itself in a position to act intelligently with respect to said charge, to-wit,—on or about the 13th day of May, 1930, it received a further notice from them, stating that a suit was being commenced, a Bill of Complaint having been prepared and forwarded to the Western District of New York for service; that prior to the commencement of this suit defendant was given no other notice and no opportunity to take any intelligent action respecting plaintiff's charge of infringement.

[fol. 22] 8. Defendant denies all allegations contained in paragraph numbered four of the Bill of Complaint with reference to prior knowledge and use of the alleged improvements set forth in said Letters Patent; the existence of prior patents therefor; the description thereof in printed publications; the public use; the placing on sale; the patenting or published description thereof more than two years prior to the plaintiff's said application; and the abandonment of said alleged invention.

9. Defendant denies that any invention of the plaintiff is disclosed or covered by, or claimed in said Letters Patent, and denies that anything embodying an invention made by the plaintiff has ever been made, used, or sold by the defendant.

10. Defendant denies that it has ever been engaged in the manufacture, sale or use of incubators which embody any invention of said Letters Patent numbered 1,262,860 or purporting to be described and claimed therein, and denies that it has in any way infringed, or incited or contributed to any infringement by others, of the alleged method of hatching eggs as set forth in claims 1 or 2 or 3 of said Letters Patent, and further denies that it has ever

made or sold or used, or contributed to the manufacture, sale or use of incubators made in accordance with claim 5 of said Letters Patent, and denies that it has ever intended or threatened to infringe said Letters Patent.

11. Defendant is informed and admits that the plaintiff has expended large sums of money in the manufacture and [fol. 23] sale of incubators made in general accordance with the drawings and specification of said Letters Patent, but defendant denies that the alleged invention claimed thereby has proven to be of value and denies that such incubators have acquired a high reputation or recognition of utility except as to features common to other incubators designed and marketed prior to the said alleged invention of the plaintiff, and denies that the plaintiff's said incubators possess superior qualities and/or functions over other incubators previously designed and marketed as aforesaid, and denies that said patent has been widely recognized and respected. Defendant is informed and believes and therefore avers that said Letters Patent have been generally disregarded and believed to be either invalid or limited to the precise features shown and described therein. Defendant is without knowledge as to profits made by the plaintiff from the manufacture and sale of incubators, as alleged in the Bill of Complaint but defendant is informed and verily believes and therefore says that said The Buckeye Incubator Company has been adjudicated a bankrupt, that a receiver in bankruptcy was duly appointed and that its assets have been sold to a purchaser who intends to continue the business of manufacturing incubators but not under any authority derived from the plaintiff.

12. Defendant is informed and admits that the plaintiff has instituted suits in various District Courts of the United States charging others with having infringed said Letters Patent, but denies that the validity thereof has been estab- [fol. 24] lished by any decrees except as against servile imitations by persons who had also been guilty of inequitable conduct, and as against persons who had been guilty of unfair competitive tactics whereby they had forfeited their standing in Court. Defendant is informed and believes and therefore avers that except for such decrees and others obtained by consent or settlement the plaintiff has been unsuccessful in litigation, and that in all such suits heretofore tried, contesting defendants who were not

servile imitators and not guilty of unfair competition, were successful in their defenses, and that decrees have been entered in such cases, construing and limiting the claims of said Letters Patent to substantially the exact method and structure shown and described therein, and to a method and a structure not used by this defendant.

Further answering, Defendant says:

13. That the alleged method purporting to be patented in and by the claims numbered 1, 2 and 3 of the plaintiff's said Letters Patent numbered 1,262,860 is not patentable under the laws of the United States for the reason that said claims set forth and attempt to monopolize merely the functions of the plaintiff's incubator as shown in the drawings and described in the specification of said patent.

14. That the alleged method as set forth in the claims numbered 1, 2 and 3 of the plaintiff's said patent and in each of them, is limited to the functions and mode of operation which the plaintiff's incubator as set forth in claim 5 of said patent is intended and designed to perform and that [fol. 25] the incubator set forth in said claim 5 is essential to said mode of operation and to the performance of said functions; that in defendant's incubators such a mode of operation is not possible and such functions are not and cannot be performed in the manner set forth in said claims 1, 2 and 3, or in any of them, and that therefore, said defendant's incubator is not equivalent for the plaintiff's incubator as set forth in his said patent in suit and is not an infringement of said Letters Patent.

15. Defendant is informed and believes and therefore avers that in the course of the prosecution in the United States Patent Office of the plaintiff's application for the Letters Patent in suit numbered 1,262,860 such proceedings were had and such representations, admission, recantations and disclaimers made in behalf of the plaintiff and such interpretations of the claims involved in this suit were made in his behalf and for the purpose of procuring the grant of said Letters Patent, that the plaintiff became and now is estopped to assert that such claims cover or monopolize or patent the subject matter of any incubator made, sold or used by defendant.

16. That in view of the state of the art existing prior to the alleged invention by Samuel B. Smith of the subject

matter of said Letters Patent No. 1,262,860 the said patent, if valid, must be construed and limited to the precise method and structure disclosed in the drawings and description of said Letters Patent and that none of the claims of said Letters Patent cover or were intended to cover any incubator [fol. 26] sold by the defendant and that none of the incubators made and sold by the defendant are embraced within the claimed subject matter of said Letters Patent but that defendant's incubators and each of them are different in structure and design and are capable of no mode of operation or method invented by the plaintiff, and that defendant's incubators are not either in structure or in method of use an equivalent for or an embodiment of anything invented by the plaintiff or which the planitiff has any lawful right to monopolize in and by the patent in suit.

17. Defendant is informed and believes and therefore avers that the claims 1, 2, 3 and 5 of the patent in suit numbered 1,262,860 have been construed and limited by judicial interpretation and adjudication in suits against other manufacturers of incubators and that, as so construed and limited, nothing contained in defendant's incubators or in any mode of operation thereof of which the same are capable, is an infringement of said claims or of any of them, or of said Letters Patent.

18. Defendant is informed and believes and therefore avers that said alleged invention purporting to be patented in and by said Letters Patent numbered 1,262,860 was abandoned by said Samuel B. Smith, by the manufacture and public use of such incubators for purposes other than experimentation, for a period of more than two years prior to the filing of said application.

19. This defendant further says that said Letters Patent [fol. 27] are ineffective to claim or monopolize anything made by this defendant for the reason that the same as to all features and combinations of features disclosed in said Letters Patent and also found in defendant's incubator are mere aggregations of features and elements and combinations of features and of elements common to the prior art and known to and used by manufacturers of incubators generally prior to the alleged invention thereof by the plaintiff

and more than two years prior to his said application and that no invention was required to so aggregate them in a single incubator and no new result was obtained by so doing.

Further answering, this defendant says:

20. Defendant is informed and believes and therefore avers that the Letters Patent in suit number 1,262,860 are null and void and have no force and effect whatsoever for the reason that the alleged invention or improvement described and attempted to be claimed and monopolized in and by said Letters Patent and every material and substantial part thereof, was shown and described and patented and shown disclosed and described in printed publications prior to the alleged invention or discovery thereof by said Samuel B. Smith in and by the following specified Letters Patents and publications, to-wit:

United States Letters Patent

Number	Name	Date
3,019	Napoleon E. Guerin	Mar. 30, 1843
240,004	Paul H. Bate	Apr. 12, 1881
335,961	Edw. G. Renwich	Feb. 9, 1886

[fol. 28]

347,946	Jacob K. Meschter	Aug. 24, 1886
540,107	Norman McAslan	May 28, 1895
553,723	Josiah K. Proctor	Jan. 28, 1896
559,260	John T. Butts	Apr. 28, 1896
605,806	Joseph McCreery	June 14, 1898
656,760	Granville T. Woods	Aug. 28, 1900
691,837	Virgil S. Bell	Jan. 28, 1902
780,912	Wm. H. Phillips	Jan. 24, 1905
789,719	John M. Day	May 16, 1905
828,181	Geo. H. Boyd	Aug. 7, 1906
843,909	F. M. Peters, et al.	Feb. 12, 1907
891,019	Luigi Verna	June 16, 1908
917,483	C. C. Peck	Apr. 6, 1909
951,650	Wm. Miller	Mar. 8, 1910
1,137,752	Geo. E. Goldstein	May 4, 1915
1,165,958	Thos. B. Freas	Dec. 28, 1915
1,205,445	Roy F. Fullington	Nov. 21, 1916
4,991	Hawley	July 16, 1872
Re. 11,460	Proctor	Dec. 25, 1894

United States Letters Patent—Continued

Number	Name	Date
152,644	Jones, et al.	June 30, 1874
165,121	Reynolds	June 29, 1875
280,490	Lumpp	July 3, 1883
286,756	Winkler	Oct. 16, 1883
410,110	Knowles, et al.	Aug. 27, 1889
426,321	Proctor	Apr. 22, 1890
432,282	Proctor	July 15, 1890
535,175	Schwartz	Mar. 5, 1895
770,967	Iden	Sept. 27, 1904
798,697	Perkins	Sept. 5, 1905
915,412	Cherry	Mar. 16, 1909
1,010,809	Schmidt, et al.	Dec. 5, 1911
1,017,713	Vaughan	Feb. 20, 1912
1,096,708	Furley	May 12, 1914
1,144,232	Osborn	June 22, 1915
1,166,311	Bales	Dec. 28, 1915

[fol. 29]

1,270,900	Viviano	July 2, 1918
1,086,903	Domenica	Feb. 10, 1914
493,467	Baker	Mar. 14, 1893
1,034,205	Cogburn	July 30, 1912
1,960	Nyce	May 16, 1865
712,007	Schiff	Oct. 28, 1902
40,148	Smith	Sept. 29, 1863
143,912	Kirby	Oct. 21, 1873
219,975	Paresetti	Sept. 23, 1879
1,086,567	Stone	Feb. 10, 1914
535,982	Emerson	Mar. 19, 1895
664,751	Hollingsworth	Feb. 25, 1900
1,160,793	Van Keuren	Nov. 16, 1915
992,622	Wiebe	May 16, 1911
832,151	Newsom	Oct. 2, 1906
614,493	Newsom	Nov. 22, 1898
339,837	Barnes	Apr. 13, 1886
1,087,995	Sturtevant	Feb. 24, 1914
271,184	Altenbrand	Jan. 23, 1883
84,190	Hosmer	Nov. 17, 1868
95,075	Bundley	Sept. 21, 1869
530,051	Moore	Nov. 27, 1894
29,775	Randall	June 19, 1860

United States Letters Patent—Continued

Number	Name	Date
300,118	Parker	Mar. 23, 1909
916,273	Coons	
754,749	Cooper	Aug. 2, 1870
105,891	Blake	Oct. 28, 1884
307,116	Jennings	Apr. 29, 1884
297,676	Conant	Apr. 28, 1908
886,325	Osborne	Aug. 21, 1917
1,237,874	Martini	June 7, 1859
24,325	Neubauer, et al.	Sept. 14, 1909
934,274	Bradley	Oct. 22, 1895
548,573	Moller, et al.	Aug. 11, 1874
153,948	Haight	

[fol. 30]

330,457	Bassini, et al.	July 2, 1886
709,650	Scott	Jan. 9, 1903
916,454	Koons	May 1, 1909
1,119,090	Madary	Jan. 18, 1915
786,256	Axford	Apr. 4, 1905
874,696	McCarty	Dec. 24, 1907
1,277,530	Barba	Sept. 3, 1918
1,284,611	Crumpton	Nov. 12, 1918
1,263,138	Smith	Apr. 16, 1918
1,158,447	Coleman	Nov. 2, 1915
1,100,368	George	June 16, 1914
787,671	Jacobson	Apr. 18, 1905
1,231,112	Allison	June 26, 1917
305,065	Enggren	Sept. 16, 1884
115,564	Briggs	June 6, 1871
410,017	Phillips	Aug. 27, 1889
345,236	Jordan	July 6, 1886
263,584	Rice	Aug. 29, 1882
32,597	Duncan	June 18, 1861
1,214,053	Mendenhall	Jan. 30, 1917
797,689	Kellogg	Aug. 22, 1905
676,950	Hawkins	June 25, 1901
206,389	Clegg	July 30, 1878
1,237,874	De Martini	Aug. 21, 1917
1,225,382	Wells	May 8, 1917
758,695	Riotte	May 3, 1904
198,422	Smith	Dec. 18, 1877

United States Letters Patent—Continued

Number	Name	Date
449,231	Phillips	Mar. 31, 1891
596,386	Smith	Dec. 28, 1897
571,424	Wolfe	Nov. 17, 1896
44,324	Lippy, et al.	Sept. 20, 1864
173,016	Jones	Feb. 1, 1876
1,198,604	Tegoli	Sept. 19, 1916
34,864	Petrie	Apr. 1, 1862

[fol. 31]

1,165,917	Tegoli	Dec. 28, 1915
1,142,483	Broemer, et al.	June 8, 1915
1,140,009	Tashjan	May 18, 1915
1,060,414	Ayres	Apr. 29, 1913
158,391	Sandholzer	Jan. 5, 1875
288,124	Schmolz	Nov. 6, 1883
327,900	Rogers	Oct. 6, 1885
335,351	Hatch	Feb. 2, 1886
77,253	Cheyney	Apr. 28, 1868
1,293,495	Mackay, et al.	Feb. 4, 1919
669,537	Michaud	Mar. 12, 1901
47,991	Shaler	May 30, 1865
440,786	Bond	Nov. 18, 1890
449,170	Phillips	Mar. 31, 1891
1,135,556	Tegoli	Apr. 13, 1915
1,174,627	Sicignana	Mar. 7, 1916
120,253	Endeman	Oct. 24, 1871
193,616	Renwick	July 31, 1877
217,148	Renwick	July 1, 1879
224,224	Renwick	Feb. 3, 1880
272,744	Morgan	Feb. 20, 1883
320,463	Cutting	June 23, 1885
344,474	Campbell	June 29, 1886
456,407	Frey, et al.	July 21, 1891
559,676	Christiansen	May 5, 1896
591,870	Morgan	Oct. 19, 1897
725,079	Hawkins	Apr. 14, 1903
735,409	Pedersen	Aug. 4, 1903
745,458	Perkins	Dec. 1, 1903
949,653	Klinke	Feb. 15, 1910
1,075,747	Zimmer	Oct. 14, 1912
1,100,146	Olson	June 16, 1914

United States Letters Patent—Continued

Number	Name	Date
1,195,705	Martin	Aug. 22, 1916
1,222,617	Frye	Apr. 17, 1917
10,288	(British) John Gardner	1887

[fol. 32]

10,019	(British) Timar	May 14, 1901
22,557	(British) Mann	1899
155,917	(German) E. Stulik	Nov. 11, 1904
117,089	(German) Mann	Feb. 4, 1901
322,047	(French) Maginez	May 13, 1903
450,706	(French) Haas	Jan. 25, 1913
401,431	(French) Lourdel	Oct. 2, 1909
453,958	(French)	Feb. 3, 1913
345,878	(French) Rachaine	1904
457,043	(French)	Sept. 10, 1913
457,497	(French) Furley	Sept. 18, 1913
468,168	(French)	June 30, 1914
472,728	(French)	Dec. 16, 1914
474,022	(French)	Feb. 4, 1915
476,828	(French)	Sept. 2, 1915
481,043	(French) Forbes	Oct. 24, 1916
448,981	(French) Mucke	Feb. 14, 1913
27,629	(Swiss) Iden	Apr. 2, 1904
51,062	(Swiss)	

Publications

"The Dollar Hen", by Milo Hastings, Published 1909 by The Arcadia Press, New York City, Pages 77 to 107, inclusive.

"Poultry Culture", Topeka, Kansas, Issue of February, 1912, Article entitled "The Mammoth Incubator Outmammothed".

"Boston Sunday Globe", Boston, Mass., Issue of November 10, 1912, Article entitled "Indoor Chicken Factories".

"Technical World", Chicago, Ill., Issue of April, 1913, Article entitled "Hatching Chickens by Wholesale".

[fol. 33] "The New Egg Farm or the Management of Poultry on a Large Scale for Commercial Purposes" by H. S. Stoddard. Published by Orange

Judd Co., New York, 1900, and added to the Patent Office Library on the 29th day of January, 1901—particularly pages 299 to 303, inclusive.

"Incubators and their Management", by J. H. Sutcliffe, 1910.

"Drying Machinery and Practice", by T. G. Marlow, 1910.

"Plenum Ventilation", by Griffiths, 1905.

"Warming Buildings by Hot Water", by Hood, 3rd Edition, 1891.

"Heating and Ventilating Buildings", by Carpenter, 1910.

"Heating and Ventilation", by A. H. Barker, 1912.

"Handbook for Heating and Ventilating Engineers", by Hoffmann, 3rd Edition, 1913.

"The Art of Hatching and Bringing up Domestic Fowl of all Kinds", by M. DeReaumur, London, 1750.

"Incubation and Its Natural Laws", by Charles H. Cyphers.

"The Incubator", by James Rankin, 1886.

"Artificial Incubating and Brooding", Reliable Poultry Journal, 1888.

Catalog of Hugon & Co., Ltd., Manchester, England, 1915, showing Fat Dryer, page 32.

Catalog of Robert Gibson & Sons, Ltd., Manchester, England, 1913, showing Confectionery Dryer, pages 5 and 21.

Catalog of Linfoot & Cooper, Manchester, England, 1910, showing Colour Dryer, page 27.

[fol. 34] And by various other prior patents and publications not now known to this defendant but which this defendant prays leave to insert in this answer by suitable amendment when ascertained.

21. Defendant is informed and believes and therefore avers that said Letters Patent numbered 1,262,860 are null and void and have no force and effect because in this country, prior to any date of the alleged invention thereof by Samuel B. Smith and for more than two years prior to the date of said application, devices, to-wit, incubators embodying the alleged invention and every substantial and material part thereof were manufactured, placed on sale, sold and/or publicly used by the persons and at their places of

address mentioned in the patents and publications listed in the foregoing paragraph numbered 20 hereof and by the following persons whose names and addresses are hereby given as follows, to-wit:

Walter B. Davis and Milo Hastings, at Kings Highway & 23rd St., Brooklyn, New York.

John Lieber and Milo Hastings, at Muskogee, Oklahoma.

E. T. Powers and Milo Hastings, at Port O'Connor, Texas.

Chas. A. Cyphers, at Philadelphia, Pa. Stroudsburg, Pa.

Rolla Lawry, at Pacific, Mo.

Bert W. Boling, of Brownstown, Indiana, at said Brownstown.

[fol. 35] And by various other persons whose names and addresses are not now known to defendant but which it prays leave to give and mention in this answer by amendment hereto, when ascertained.

22. Defendant is informed and believes and therefore avers that said Samuel B. Smith was not the first inventor of anything embodied in defendant's incubator nor of any method of use practiced or caused or intended by the defendant to be practiced but that each and all features of method or of structure employed by defendant and also disclosed in said Letters Patent 1,262,860 were invented, perfected, discovered and/or designed by each of the several patentees and persons above named in paragraphs numbered 20 and 21 hereof, at their respective adresses as given in their said patents, and set opposite their respective names in paragraph 21, all of whom were each continuously diligent in adapting and perfecting his incubators embodying such improvements or inventions and in reducing the same to practice from a date prior to any date of the alleged invention thereof by Samuel B. Smith and prior to any date following which said Samuel B. Smith was diligent in the completion of his alleged invention and that said Letters Patent are therefore ineffective to lawfully claim and monopolize any method or structure used by the defendant or intended, or caused by the defendant to be used.

23. Defendant further says that said Letters Patent are null and void and ineffective to lawfully claim and monop-

[fol. 36] lize any method or structure used by the defendant for the reason that the plaintiff failed to comply with the Statutes in such case made and provided, in that the written description of said alleged invention and of the manner and process of making, constructing and using it was not set forth in the plaintiff's application for said Letters Patent and is not set forth in said Letters Patent in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains or with which it is most nearly connected, to make, construct and use the same, and the alleged principle thereof and the best contemplated mode of applying that principle was not explained in the plaintiff's said application and is not explained in said Letters Patent so as to distinguish the alleged invention from other inventions, and that said application did not, and said Letters Patent do not, particularly point out and/or distinctly claim in said claims 1, 2, 3 and 5 thereof, or in any of them, the part, improvement or combination of parts which the plaintiff claimed or now claims as his invention or discovery.

24. Defendant further says that all elements, features, and combinations of features common to the incubator disclosed in the plaintiff's said patent and to this defendant's incubators, are also common to the incubators disclosed in the prior patents and publications aforesaid and prior to the said alleged invention of the plaintiff were commonly known to and used by the public generally and are not and cannot lawfully be covered or monopolized by said Letters Patent numbered 1,262,860.

[fol. 37] 25. Defendant further avers that said Letters Patent are null and void because the complete specification of the said Letters Patent does not sufficiently describe or ascertain the nature of the said alleged invention or in what manner the same is to be performed and in particular contains no or no sufficient directions:

(a) As to the nature, capacity, arrangement or manipulation of the "restricted openings" or as to when or in what quantities foul air is to be discharged therefrom or fresh air is to be admitted thereby or as to whether or when or to what extent such fresh air is to be charged with steam or as to what is an undue loss of moisture or how it is to be [illegible].

(b) As to the velocity with which the air is to be impelled.

(c) As to the manner in which the heated air may be properly adapted to the eggs in various stages of incubation.

(d) As to what temperature is to be maintained in the apparatus or different parts thereof and what temperature is injurious therein.

(e) As to how units of heat may be carried from eggs in the more advanced stage of incubation to those in a less advanced stage and the air throughout the chamber maintained at substantially the same temperature, or as to how either of such objects may be attained.

[fol. 38] 26. Defendant further avers that said Letters Patent are null and void because the complete specification of the said Letters Patent is ambiguous and does not sufficiently ascertain the ambit of the monopoly claimed and, in particular:

(a) The expressions "applying a current of heated air", "whereby the air will be vitalized" and "for the purpose specified" are wholly vague and indefinite, or meaningless.

(b) No purpose is specified therein.

(c) It is uncertain what, if any degree of vitalization is contemplated.

(d) The public cannot distinguish the method claimed from the methods of incubation previously existing nor can they ascertain whether a given apparatus does or does not fall within the claims.

27. Defendant further avers that said Letters Patent are null and void because the complete specification of the said Letters Patent is misleading and contains false suggestions, in particular in that it is stated or suggested therein:

(a) That there is any advantage in forced draft.

(b) That there is any advantage in passing a current of air first through the eggs in a more advanced stage of incubation.

[fol. 39] (c) That eggs during incubation develop any appreciable heat or enough heat to cause an appreciable rise

in temperature in eggs contained in an incubator of ordinary construction.

(d) That anything therein described enables the rise in temperature to be prevented from reaching an injurious point with any more certainty than the methods previously existing or that an injurious temperature was in fact reached in previous methods.

(e) That anything therein described effects any improvement upon or beneficial alteration in the procedure of previous methods.

28. Defendant further avers that said Letters Patent are null and void because an inoperative machine is disclosed thereby because the process is inoperative if practiced as taught, that it lacks invention and that it is a mere adoption and extension of well-known principles of heating and ventilating.

Wherefore the defendant avers that the plaintiff is entitled to no relief whatever and prays that the Bill of Complaint be dismissed, with costs to be taxed against the plaintiff.

James Manufacturing Co., by John S. Powers, Defendant's Solicitor, 1080 Ellicott Square, Buffalo, N. Y. S. L. Wheeler, Toulmin & Toulmin, of Counsel for Defendant.

[fol. 40] In the United States District Court

[Title omitted]

Plaintiff's Motion for Bill of Particulars

Now comes the plaintiff herein and moves that the defendant shall be ordered to furnish better particulars as to its defense in the following respects:

(a) State which of the one hundred forty-one (141) United States Patents, three (3) British Patents, two (2) German Patents, thirteen (13) French Patents and two (2) Swiss Patents referred to in Paragraph 20 of the Answer, it will offer in evidence at the trial of this case to support the defenses set up, and upon which of said patents it will rely upon for any of said defenses.

(b) State which of the nineteen (19) publications referred to in Paragraph 20 of the Answer, it will offer in evidence at the trial of this case to support the defenses set up, and upon which of said patents it will rely upon for any of said defenses.

[fol. 41] (c) State which of the six (6) prior uses alleged in Paragraph 21 of the Answer, the defendant will attempt to prove at the trial of this case, or upon which it will rely to support any of the defenses set up in this case.

(d) Furnish complete description of such prior uses, the apparatus employed therein, and when and where such uses occurred.

Charles W. Parker, Attorney for Plaintiff. Charles W. Parker, A. L. Ely, of Counsel.

Receipt of the above Motion for Bill of Particulars acknowledged this — day of September, 1932.

Toulmin & Toulmin, Attorneys for Defendant.

[fol. 42] In the United States District Court

[Title omitted]

Answers of Defendant to Plaintiff's Motion for Bill of Particulars—Filed October 28, 1932

The defendant furnishes the following bill of particulars in compliance with the plaintiff's motion and makes answers to the specific questions propounded therein as follows:

Answer to Question 1:

The defendant expects to offer in evidence at the trial of this case, to support the defenses set-up, the following letters patent:

120,253	H. Endeman	October	24, 1871
173,016	C. W. & E. A. Jones	February	1, 1876
193,616	E. S. Renwick	July	31, 1877
198,422	H. B. Smith	December	18, 1877
206,389	T. Clegg	July	30, 1878
240,004	P. H. Bate	April	12, 1881

280,490	Lumpp	July	3, 1883
288,124	W. Schmolz	November	6, 1883
327,900	W. H. Rogers	October	6, 1885
410,017	J. J. Phillips	August	27, 1889
432,282	Proctor, et al.	July	15, 1890
440,786	J. Bond	November	18, 1890
449,231	S. G. Phillips	March	31, 1891
Re. 11,460	J. K. Proctor	December	25, 1894
535,175	C. W. Schwartz, Jr.	March	5, 1895
540,107	N. McAslan	May	28, 1895
553,723	J. K. Proctor	January	28, 1896
559,260	J. T. Butts	April	28, 1896
691,837	V. S. Bell	January	28, 1902
798,697	F. C. Perkins	September	5, 1905
891,019	L. Verita	June	16, 1908
917,483	C. C. Peck	April	6, 1909
934,274	M. E. Bradley	September	14, 1909
1,010,809	J. Schmidt & H. Schutterle	December	5, 1911
1,086,567	G. Stone	February	10, 1914
1,086,903	A. DiDomenica & A. Amicarelli	February	10, 1914
1,096,708	R. G. Furley	May	12, 1914
1,144,232	C. H. Osborn	June	22, 1915
1,270,900	S. Viviano	July	2, 1918
10,288	(British) John Gardner		1887

Answer to Question 2:

The defendant expects to offer in evidence at the trial of this case, to support the defenses set-up, the following publications, being all of the publications mentioned in paragraph 20 of the amended answer filed herein:

[fol. 44] "The Dollar Hen", by Milo Hastings, Published 1909 by The Arcadia Press, New York City, pages 77 to 107 inclusive.

"Poultry Culture", Topeka, Kansas, Issue of February 1912, Article entitled "The Mammoth Incubator Outmammothed".

"Boston Sunday Globe", Boston, Mass., Issue of November 10, 1912, Article entitled "Indoor Chicken Factories".

"Technical World", Chicago, Ill., Issue of April 1913, Article entitled "Hatching Chickens by Wholesale".

"The New Egg Farm or the Management of Poultry on a Large Scale for Commercial Purposes", by H. S. Stoddard. Published by Orange Judd Co., New York, 1900, and added to the Patent Office Library on the 29th day of January, 1901—particularly pages 299 to 303 inclusive.

"Incubators and their Management", by J. H. Sutcliffe, 1910.

"Drying Machinery and Practice", by T. G. Marlow, 1910.

"Plenum Ventilation", by Griffiths, 1905.

"Warming Buildings by Hot Water", by Hood, 3rd Edition, 1891.

"Heating and Ventilating Buildings", by Carpenter, 1910.

"Heating and Ventilation", by A. H. Barker, 1912.

"Handbook for Heating and Ventilating Engineers", by Hoffman, 3rd Edition, 1913.

"The Art of Hatching and Bringing up Domestic Fowl of all Kinds", by M. DeReaumur, London, 1750.

[fol. 45] "Incubation and Its Natural Laws", by Charles H. Cyphers.

"The Incubator", by James Rankin, 1886.

"Artificial Incubating and Brooding", Reliable Poultry Journal, 1888.

Catalogue of Hugon & Co. Ltd., Manchester, England, 1915, showing Fat Dryer, page 32.

Catalogue of Robert Gibson & Sons, Ltd., Manchester, England, 1913, showing Confectionery Dryer, pages 5 and 21.

Catalogue of Linfoot and Cooper, Manchester, England, 1910, showing Colour Dryer, page 27.

Answer to Question 3:

The defendant expects to prove at the trial of this case, and will rely upon the same, the prior use of Bert W. Boling.

Answer to Question 4:

The defendant is at present advised and informed that the priof use of said Bert W. Boling consisted of the mann-

facture, sale and use of an incubator by said Bert W. Boling at Brownstown, Indiana, prior to any date of the alleged invention, alleged to be covered in letters patent No. 1,262,-862, and for more than two years prior to the date of the application for said patent at said Brownstown, Indiana.

John S. Powers, Solicitor for Defendant. H. A. Toulmin, H. A. Toulmin, Jr., of Counsel.

[fol. 46] IN THE UNITED STATES DISTRICT COURT

[Title omitted]

AMENDED ANSWERS OF DEFENDANT TO PLAINTIFF'S MOTION FOR BILL OF PARTICULARS—Filed October 31, 1932

The defendant furnishes the following bill of particulars in compliance with the plaintiff's motion and makes answers to the specific questions propounded therein as follows:

Answer to Question 1:

The defendant expects to offer in evidence at the trial of this case, to support the defenses set-up, the following letters patent:

3,019	N. A. Guerin	March	30, 1843
120,253	H. Endeman	October	24, 1871
173,016	C. W. & E. A. Jones	February	1, 1876
193,616	E. S. Renwick	July	31, 1877
198,422	H. B. Smith	December	18, 1877
206,389	T. Clegg	July	30, 1878
240,004	P. H. Bate	April	12, 1881
280,490	Lumpp	July	3, 1883

[fol. 47]

288,124	W. Schmolz	November	6, 1883
327,900	W. H. Rogers	October	6, 1885
335,961	E. S. Renwick	February	9, 1886
347,946	J. K. Meschter	August	24, 1886
410,017	J. J. Phillips	August	27, 1889
432,282	Proctor, et al.	July	15, 1890
440,786	J. Bond	November	18, 1890
449,231	S. G. Phillips	March	31, 1891
11,460	J. K. Proctor	December	25, 1894

535,175	C. W. Schwartz, Jr.	March	5, 1895
540,107	N. McAslan	May	28, 1895
553,723	J. K. Proctor	January	28, 1896
559,260	J. T. Butts	April	28, 1896
656,760	G. T. Woods	August	28, 1900
691,837	V. S. Bell	January	28, 1902
780,912	N. H. Phillips	January	24, 1905
789,719	J. M. Day	May	16, 1905
798,697	F. C. Perkins	September	5, 1905
828,181	G. H. Boyd	August	7, 1906
843,909	F. M. Peters, et al.	February	12, 1907
891,019	L. Verna	June	16, 1908
917,483	C. C. Peck	April	6, 1909
934,274	M. E. Bradley	September	14, 1909
951,650	Wm. Miller	March	8, 1910
1,010,809	J. Schmidt & H. Schutterle	December	5, 1911
1,086,567	G. Stone	February	10, 1914
1,086,903	A. DiDomenica & A. Amicarelli	February	10, 1914
1,096,708	R. G. Furley	May	12, 1914
1,137,752	Geo. E. Goldstein	May	4, 1915
1,144,232	C. H. Osborn	June	22, 1915
1,165,958	T. B. Freas	December	28, 1915
1,166,311	J. J. F. Bales	December	28, 1915
1,205,445	Roy F. Fullington	November	21, 1916

[fol. 48]

1,270,900	S. Viviano	July	2, 1918
10,288	(British) John Gardner		1887
10,019	(British) Ignaz Timar		1901
155,917	(German) Stulik	November	11, 1904

Answer to Question 2:

The defendant expects to offer in evidence at the trial of this case, to support the defenses set-up, the following publications, being all of the publications mentioned in paragraph 20 of the amended answer filed herein:

"The Dollar Hen", by Milo Hastings, Published 1909 by The Arcadia Press, New York City, pages 77 to 107 inclusive.

"Poultry Culture", Topeka, Kansas, Issue of February, 1912, Article entitled "The Mammoth Incubator Out-Mammothed".

"Boston Sunday Globe", Boston, Mass., Issue of November 10, 1912, Article entitled "Indoor Chicken Factories".

"Technical World", Chicago, Ill., Issue of April, 1913. Article entitled "Hatching Chickens by Wholesale".

"The New Egg Farm or the Management of Poultry on a Large Scale for Commercial Purposes", by H. S. Stoddard, Published by Orange Judd Co., New York, 1900, and added to the Patent Office Library on the 29th day of January, 1901—Particularly pages 299 to 303 inclusive.

"Incubators and their Management", by J. H. Sutcliffe, 1910.

[fol. 49] "Drying Machinery and Practice, by T. G. Marlow, 1910.

"Plenum Ventilation", by Griffiths, 1905.

"Warming Buildings by Hot Water", by Hood, 3rd Edition, 1891.

"Heating and Ventilating Buildings", by Carpenter, 1910.

"Heating and Ventilation", by A. H. Barker, 1912.

"Handbook for Heating and Ventilating Engineers", by Hoffman, 3rd Edition, 1913.

"The Art of Hatching and Bringing up Domestic Fowl of all Kinds", by M. DeReaumur, London, 1750.

"Incubation and its Natural Laws", by Charles H. Cyphers.

"The Incubator", by James Rankin, 1886.

"Artificial Incubating and Brooding", Reliable Poultry Journal, 1888.

Catalogue of Hugon & Co. Ltd., Manchester, England, 1915, showing Fat Dryer, Page 32.

Catalogue of Robert Gibson & Sons, Ltd., Manchester, England, 1913, showing Confectionery Dryer, pages 5 and 21.

Catalogue of Linfoot and Cooper, Manchester, England, 1910, showing Colour Dryer, page 27.

Answer to Question 3:

The defendant expects to prove at the trial of this case, and will rely upon the same, the prior use of Bert W. Boling.

Answer to Question 4:

The defendant is at present advised and informed that the prior use of said Bert W. Boling consisted of the manu-
[fol. 50] facture, sale and use of an incubator by said Bert W. Boling at Brownstown, Indiana, prior to any date of the alleged invention, alleged to be covered in letters patent No. 1,262,862, and for more than two years prior to the date of the application for said patent at said Brownstown, Indiana.

John S. Powers, Solicitor for Defendant. H. A. Toulmin, Jr., of Counsel.

IN THE UNITED STATES DISTRICT COURT

[Title omitted]

MOTION OF PLAINTIFF FOR SUPPLEMENTAL BILL OF PARTICULARS—Filed June 10, 1933

Now comes the plaintiff herein, by his attorneys, and moves this Honorable Court for an Order requiring defend-
[fol. 51] ant to furnish better particulars as to its defense, in the following respects.

(a) State which of the forty-two (42) United States patents and two (2) British patents set up in Defendant's Amended Answers to Plaintiff's Motion for a Bill of Particulars it will offer in evidence at the trial of this case to support any or all of the defenses set up.

(b) State which of the nineteen (19) publications set up in said Amended Answers it will offer in evidence at the trial of this case to support any or all of the defenses set up.

(c) Give the name of the publisher of each of the nineteen (19) publications set forth in said Amended Answers and the pages or passages from such publications upon

which defendant expects to rely, and state in what library, or other place, copies of same may be found.

(d) Give a full and complete description of the alleged prior use of Bert W. Boling of Brownstown, Indiana, set forth in the Amended Answers of the Defendant to Plaintiff's Motion for Particulars, together with a full and complete description of the apparatus alleged to have been used by the said Bert. W. Boling at Brownstown, Indiana, and the date of such alleged prior use upon which the defendant expects to rely.

Charles W. Parker, Attorney and Solicitor for Plaintiff. C. L. Ely, Max D. Farmer, of Counsel.

[fol. 52] In the United States District Court

[Title omitted]

Defendant's Response to Plaintiff's Motion for Supplemental Bill of Particulars—Filed June 19, 1933

In response to Plaintiff's motion for a supplemental bill of particulars, defendant hereby, without contest or hearing, furnishes such particulars.

Answering Question (a), defendant says that of the patents pleaded, it will offer in evidence and rely upon the following:

3,019	N. A. Guerin	March	30, 1843
120,253	H. Endeman	October	24, 1871
193,616	E. S. Renwick	July	31, 1877
198,422	H. B. Smith	December	18, 1877
206,389	T. Clegg	July	30, 1878
240,004	P. H. Bate	April	12, 1881
280,490	Lumpp	July	3, 1883
327,900	W. H. Rogers	October	6, 1885
347,946	J. K. Meschter	August	24, 1886
410,017	J. J. Phillips	August	27, 1889
432,282	Proctor, et al.	July	15, 1890
[fol. 53] Re. 11,460	J. K. Proctor	December	25, 1894
535,175	C. W. Schwartz, Jr.	March	5, 1895
540,107	N. McAslan	May	28, 1895
553,723	J. K. Proctor	January	28, 1896
691,837	V. S. Bell	January	28, 1902

798,697	F. C. Perkins	September 5, 1905
843,909	F. M. Peters, et al.	February 12, 1907
891,019	L. Verna	June 16, 1908
917,483	C. C. Peck	April 6, 1909
934,274	M. E. Bradley	September 14, 1909
1,010,809	J. Schmidt & H. Schutterle	December 5, 1911
1,086,567	G. Stone	February 10, 1914
1,144,232	C. H. Osborn	June 22, 1915
1,165,958	T. B. Freas	December 28, 1915
1,166,311	J. J. F. Bales	December 28, 1915
1,205,445	R. F. Fullington	November 21, 1916
1,270,900	S. Viviano	July 2, 1918
10,288	(British) John Gardner	1887
155,917	(German) Stulik	November 11, 1904

Answering Questions (b) and (c), Defendant says that of the publications pleaded it will offer in evidence and rely upon the following:

"The Dollar Hen", by Milo Hastings, Published 1909, by the Arcadia Press, New York City, pages 77 to 107 inclusive.

"Technical World", Chicago, Ill., Issue of April, 1913, Article entitled "Hatching Chickens by Wholesale".

"The New Egg Farm or the Management of Poultry on a Large Scale for Commercial Purposes", by H. S. Stoddard, Published by Orange Judd Co., New York, 1900, particularly pages 299 to 303 inclusive.

[fol. 54] "The Art of Hatching and Bringing up Domestic Fowl of all Kinds", by M. DeReaumur, London, 1750, particularly the following pages: 1; 2 (lines 1-13); 3 (lines 5 to end); 4; 5 (line 1 and lines 17-27); 6 (last paragraph); 7 (lines 1-2); 9 (lines 3-18); 13 (lines 16-22 and last paragraph); 14 (lines 5-17); 15 (all except last seven lines); 16 (lines 18-32); 17 (lines 8-26); 18 (lines 19-22); 19 (lines 21-35); 20 (lines 5-16); 22 (lines 4-6) and from line 11 to end; 23 (lines 1-5 and lines 9-21); 35 (last paragraph); 36 (first six lines); 47 (first full paragraph); 48 (lines 12 to end and also opposite Plate II); 49; 50 and the opposite Plate III; 51 and the opposite Plate IV; 52, 53, 54 and the Plate numbered V; 61 (lines 7-18); 71 (lines 12-17); 116 (lines 16-23); 122 (lines 12-24);

130 (lines 10-29); 146 (line 29 to end); 147 and the opposite Plate numbered VII; 148; 149; 152 (last paragraph); 153 (lines 1-24); 154 (lines 13-18); 157 (lines 4-21); 184 (last paragraph); 185 (lines 1-12); 187 (lines 10-25); 190 (last five lines); 212 (line 23 to end, and also the opposite plate numbered VIII); 213, 214 and 215. (Printed for C. Davis, over-against Gray's Inn Gate, Holbourn, A. Millar, and J. Nourse, opposite Katherine Street, in the Strand. MDCCL.)

Answering Question (d) with reference to the Burt W. Bolling prior use of Brownstown, Ind., plaintiff is advised that defendant does not deem it necessary to prove that [fol. 55] prior use and, therefore, will not do so as the other defenses are regarded as ample.

H. A. Toulmin, H. A. Toulmin, Jr., Counsel for Defendant. John S. Powers, Solicitor for Defendant.

June 16, 1933.

UNITED STATES DISTRICT COURT

[Title omitted]

NOTICE OF PRIOR USE AND PUBLICATIONS DEFENDANT WILL RELY ON AND DEMAND UNDER EQUITY RULE 58—Filed October 7, 1933

Plaintiff is hereby given notice that at the trial of the above entitled cause, defendant will rely upon and prove [fol. 56] the prior use of Milo Hastings, at King's Highway and 23rd St., Brooklyn, New York, at Muskogee, Oklahoma, at Port O'Connor, Texas, and elsewhere in the United States, in the years 1911 and 1912, and prior thereto, as pleaded in the amended answer.

Plaintiff will also take notice that at the trial of the above entitled cause, defendant will rely upon and prove the publication "Poulty Culture", Topeka, Kansas, issue of February, 1912, article entitled "The Mammoth Incubator Outmammothed", which publication is also pleaded in the amended answer herein.

Defendant will further rely upon and prove at the trial the following publications:

Electrical World, of July 6, 1912, page 55, and of February 6, 1915, Vol. 65, No. 6, pages 362 and 363, a copy of these publications being available at the Engineering Societies Library, 29 West 39th Street, New York, New York.

Popular Mechanics Magazine, 318 W. Washington St., Chicago, Illinois, pages 630 and 631, issue of November, 1912.

Defendant attaches hereto photostatic copies of the material portions of the publications referred to above and demands, under Equity Rule 58, that plaintiff admit that such photostatic copies are true and accurate reproductions of the matter referred to and that the said works were published at the times set forth herein and that such publica- [fol. 57] tions were generally circulated in the United States at the times indicated.

The original of this notice and demand is being sent with a true and correct copy thereof to Mr. Albert L. Ely, counsel for plaintiff, Leader Building, Cleveland, Ohio, with the request that he acknowledge service on the original and return it to counsel for defendant, and that he endorse on such original his admission as demanded herein or his refusal to admit the matters covered by this demand.

Toulmin & Toulmin, Counsel for Defendant.

Receipt of copy of the above acknowledged Sept. 28, 1933.
Ely & Barrow, Solicitors for Plaintiff.

The publications are correctly reproduced.

Article appearing in the February, 1912, issue of "Poultry Culture", annexed, will be found herein as Defendant's Exhibit No. 23, page 1405 of this record.

Index cover page and pages 630 and 631 of the November, 1912, issue of "Popular Mechanics" magazine, annexed, will be found herein as Defendant's Exhibit No. 24, page 1407 of this record.

July 6, 1912, issue of "Electrical World", annexed, will be found herein as Defendant's Exhibit No. 25, page 1410 of this record.

[fol. 58] IN UNITED STATES DISTRICT COURT

[Title omitted]

STIPULATION OF CONSOLIDATION

It is stipulated by and between the attorneys for the parties to the above entitled cause, that the related and co-pending case of Samuel B. Smith vs. Elmira Hatcheries, Inc., Equity No. 254, be consolidated herewith, pursuant to a stipulation of even date entered in said Samuel B. Smith vs. Elmira Hatcheries, Inc., Equity No. 254.

Charles W. Parker, Attorney for Plaintiff. John S. Powers, Attorney for Defendant.

It is so ordered this 20th day of November, 1933.

John Knight, United States District Judge.

[fol. 59] IN UNITED STATES DISTRICT COURT

[Title omitted]

STIPULATION OF CONSOLIDATION

It is hereby stipulated, by and between the attorneys for the parties to the above entitled cause, that this cause may be, and hereby is, consolidated with the co-pending and related cause entitled Samuel B. Smith vs. James Manufacturing Company, Equity No. 253, and that, as consolidated, the causes shall be known as Samuel B. Smith vs. James Manufacturing Company and Elmira Hatcheries, Inc., Equity No. 253.

It is further stipulated, that where the papers heretofore filed in one of said causes may be, in substance, duplicates of or substantially the same as the papers filed in the other, the record on appeal may be limited, as counsel may agree, to the paper in one of said causes, e. g., pleading, stipulation, order, or other paper otherwise competent for or material to the record.

Charles W. Parker, Attorney for Plaintiff. John S. Powers, Attorney for Defendant.

So ordered this 20th day of November, 1933.

John Knight, United States District Judge.

[fol. 60] IN THE UNITED STATES DISTRICT COURT

[Title omitted]

STIPULATION LIMITING RECORD ON APPEAL—Filed September 23, 1935

Pursuant to prior stipulation heretofore filed herein and subject to the approval of the court, it is stipulated between Samuel B. Smith, plaintiff, and James Manufacturing Company and Elmira Hatcheries, Incorporated, defendants, that the two causes of Samuel B. Smith vs. James Manufacturing Co., Equity No. 253, and Samuel B. Smith vs. Elmira Hatcheries, Inc., Equity No. 254, having been consolidated as one case, the transcript of record on appeal to the Circuit Court of Appeals for the Second Circuit may be made up so as to include only the pleadings, documents and papers filed in the case of Samuel B. Smith vs. James Manufacturing Co., Equity No. 253 and the narrative statement of evidence submitted at the consolidated trial, with-
[fol. 61] out including the pleadings, documents and papers filed in the case of Samuel B. Smith vs. Elmira Hatcheries, Inc., Equity No. 254.

James Manufacturing Company, by Toulmin & Toulmin, Attorneys. Elmira Hatcheries, Inc., by Toulmin & Toulmin, Attorneys. Samuel B. Smith, by A. S. Ely, Attorney.

Approved this September 23rd, 1935. John Knight, United States Judge.

IN THE UNITED STATES DISTRICT COURT

[Title omitted]

MOTION TO DISMISS BILL OF COMPLAINT—Filed March 13, 1935

Now comes the defendant, through its counsel, Toulmin and Toulmin, and moves this Honorable Court as follows:

That plaintiff's bill be dismissed; and that plaintiff be enjoined from instituting and/or prosecuting any suit or
[fol. 62] suits against the customers of defendant who are

using James Incubators of the kind attempted to be involved in this suit, this motion being made on the following grounds:

(1) Because the plaintiff has no title to the Smith patent No. 1,262,860 dated April 16, 1918, on which this action is based, except as to incubators which have an egg capacity of more than 16,500 eggs, and because defendant's incubators are of egg capacity less than 16,500 eggs. Defendant's incubators here involved have the following egg capacity: fifty-eight hundred and eighty (5880) eggs per incubator.

(2) Because the plaintiff has heretofore granted, executed, and delivered, an exclusive license under said patent here in suit, in and by an instrument in writing, duly executed by plaintiff under date of April 29, 1927, which exclusive license is in full force and effect.

(3) Because, as to the injunction branch of this motion, plaintiff has no legal right to threaten, bring, and maintain, not only this suit, but any other suit or suits against the customers of defendant, whose incubators are all of egg capacity less than 16,500, and are not, therefore, within any present right of plaintiff.

This motion will be called up for hearing in the afternoon of March 13th, 1935, in the above named court before His Honor, Judge Knight.

Respectfully submitted, Toulmin & Toulmin, Counsel for Defendant.

Dayton, Ohio, March 11, 1935.

[fol. 63] IN THE UNITED STATES DISTRICT COURT

[Title omitted]

Narrative Statement of the Evidence

Be it remembered that at the trial of the above entitled [illegible], before Hon. John Knight, District Judge for the [illegible]ern District of New York, at the Federal Building, [illegible]lo, New York, begun on January 29, 1934, the following proceedings were had and evidence introduced which

is hereby reduced in narrative form pursuant to Equity Rule 75:

The plaintiff appeared by Messrs. Parker, Prochow & Farmer represented by Max D. Farmer, Esq., and Albert L. Ely, Esq., and George C. McConnaughey, Esq.

The defendants appeared by Messrs. Toulmin and Toulmin represented by H. A. Toulmin, Esq., and H. A. Toulmin, Jr., Esq., and John S. Powers, Esq.

Counsel for the plaintiff first offered in evidence a copy of the patent in suit stating that claims 1, 2, 3 and 5 of the patent would be relied upon.

Thereupon a copy of U. S. Letters Patent No. 1,262,860, dated April 16, 1918, was offered and received in evidence [fol. 64] and marked Plaintiff's Exhibit No. 1.

Counsel for the plaintiff then made the following statement:

Now, before the proceeding opened, I disclosed to Counsel for the defendant copies of the various instruments passing title to the plaintiff. I will just review that for a moment. The patent in suit was assigned to the Buckeye Incubator Company, prior to issuance, by an instrument dated June 4, 1917. On that condition and of that time, Smith was a licensee under the patent. He took a license back under his patent—assigned his patent to the Buckeye Company and took a license back under the patent, and that condition existed until April 29, 1927, when the Buckeye Company reassigned the patent to Dr. Smith, the original inventor, and the Buckeye Company then took a license under the patent for the manufacture of incubators of smaller sizes comparable with the size which is now made by the defendant in this case.

So that I think it is fair to say that the title to the patent is stipulated as alleged in the bill of complaint.

We have also stipulated between ourselves—the usual stipulation that uncertified copies may be used with the full force and effect of the originals, and photostatic copies of foreign patents and publications, with the right of correction if error appear.

We have also stipulated in regard to the stenographer's costs; that is, that half would be borne by each of the parties at the present time, the whole amount to be charged with the costs.

I think that takes care of the formal matters.

[fol. 65] Counsel for the plaintiff then offered in evidence a book of decisions on the Smith patent containing reported and unreported decisions with regard to the patent in suit, which book was admitted in evidence and marked Plaintiff's Exhibit No. 2.

JOSEPH INSKIP TAGGART, a witness called on behalf of the plaintiff, being first duly sworn, testified in substance as follows:

Direct examination.

By Mr. Ely:

My name is Joseph Inskip Taggart. My age is 46. My residence, Cleveland, Ohio. My present occupation is Assistant General Manager of the Smith Incubator Company. The Smith Incubator Company is a corporation of Ohio. It is engaged in the manufacture and sale of Mammoth incubators, under the Smith Patent in suit.

I am in more or less direct charge of the manufacturing of the incubators and am in direct charge of the erection and service of these machines, and am in direct charge of the research work, all experimental work; and it is also my duty to keep in contact with the various universities over the country to check on any improvements or any experiments that are going on in the universities, keep in contact with poultry developments, and to keep generally informed upon the subject of incubation and poultry. I am a graduate from Ohio Wesleyan University, at which school I gave special attention to zoology. I was graduated there with high honors in that department.

[fol. 66] While I was there, I was assistant professor for two years. After that time I taught one year. I taught zoology; and for the past ten years, or eleven years, I have been actively associated either in the hatchery work or in my present work.

During that time it has been my business to investigate poultry conditions, hatchery conditions and incubators in every state in the union. I have had experience actually running incubator plants. For four years I was in charge of a hatchery known as Smith Standard Company of Cleveland, which, at that time, had from a million to a million

and a quarter egg capacity. I also own a hatchery at the present time, and have owned two. The incubators that were used at the Smith Standard Company were a machine that was manufactured under the patent of the Smith Incubator Company. The original machines there were the first machines that were built under the patent.

I describe, just briefly, the process of incubation and the hatching of an egg as follows: An egg, as we all know, consists of three main parts, the yolk, the white and the shell. At the time the egg is laid, the shell is practically full.

The content of the egg is more than two-thirds water. The part of the egg that grows and develops into a chick under incubation is a small germ spot which is located on the top of the yolk.

The yolk is developed in the ovary of the hen, and the yolk part is many times the size of the germ spot.

When the yolk is dropped from the ovary, it lodges in the oviduct, and as it passes down the oviduct to the vent, [fol. 67] it passes certain glands which secrete various layers of albumen on the side of the yolk, and later, the shell, before the egg finally is ready to pass from the vent.

This process of moving, or this journey through the oviduct, varies 24 to 36 hours, depending upon conditions.

The egg is fertilized, generally, just a short time after it drops into the oviduct. The male germ is there waiting for it, and incubation starts right away. That is, incubation starts as soon as we have the union of the male germ and the female germ. The temperature being right, incubation will continue until the egg has passed from the vent, so that by the time an egg is laid, the average egg has been incubating from 24 to 36 hours.

After it is laid, if the egg is chilled, this incubation process stops. If it is chilled below a temperature of 69, it becomes completely dormant. When the temperature is again raised to a point of 70, incubation starts slowly, but for it to become active, it requires a temperature near our body temperature, 99 to 100 degrees.

As incubation starts again, the live germ develops rapidly. It is surrounded with excellent food, and as long as we keep the temperature right and prevent too rapid evaporation of moisture, we have development taking place.

It also requires that the egg be turned from time to time, which we will refer to later as turning or exercising the embryo.

To complete the process of hatching requires approximately 21 days from the time the egg is laid. This varies with individual eggs, with eggs from individual flocks or [fol. 68] individual hens, and varies slightly with breeds, but is it approximately 21 days. During this period, or during the fore part of this period, the embyro lives almost entirely upon the white of the egg. About the seventeenth to the eighteenth day, varying with individuals again, the white of the egg has become practically absorbed, and at that time the egg changes, or the chick changes its diet and starts using the yolk of the egg. By the time the egg is ready to hatch completely, or the chick to come from the shell, about half of the yoke has been absorbed. The other half has been drawn into its body and forms a sac or like a small egg inside the body. This will be still used as food and water, and will eventually be absorbed, sometimes in 48 hours, sometimes 72, but it will eventually become absorbed.

During this process, the animal or the embyro has been assimilating food and oxygen. Bringing these two together naturally creates heat and, roughly, the larger the embyro, the greater the amount of heat that is developed.

The embryo within the shell gets its oxygen as follows:

Oxygen is assimilated through the shell, and inside the shell is picked up by osmosis process by the placenta which covers the inside of the egg, and transmission of oxygen—as oxygen is taken in, carbon dioxide is given off. Also, there is a certain amount of moisture given off. By the time the chick emerges from the shell, approximately one-sixth of the weight of the chick, or the weight of the contents of the chick, has been evaporated.

If we evaporate too rapidly, we dry down the chick too much; we have a poor chick. It we control the evapora- [fol. 69] tion during the entire period, we get a better chick, and it is quite essential that that rate of evaporation be controlled, not just the last day, but during the entire period.

As to the total water content of the egg passing off by way of evaporation I would say, about 15 to 20 per cent. of the egg by weight, that is, the interior of the egg, by weight.

I have some graphic means of showing development of heat in the egg during the process of hatching. This graph that I have here is gotten up to show the heat development,

day by day, during the 21 days of hatching. The heavy curved line is labeled "Heat Units." Across the bottom we have numbered the different days of incubation. For each section upward from the base line we have represented that as one calory. This calory is used in the metric system as a unit of heat. It represents approximately four B. T. U.'s or British thermal units, and a British thermal unit represents the amount of heat that is necessary to raise a pound of water one degree.

That is the large calory that I speak of.

That is not the small calory they speak about in food.

By following the heavy black line, or the heat curve, you will note that it starts upward somewheres about the fourth or fifth day of incubation.

Now, prior to that time, there is no heat developed. There is some heat actually absorbed due to chemical changes that are taking place within the egg, but you will note, from the fifth day on, the heat curve raises gradually until approximately the 17th day, at which time the heat [fol. 70] development is arrested for a period. It is right at the time when they are changing from the feeding on the white of the egg to the yolk of the egg, and then, after a period of 24 to 35 hours, it starts up again.

Now, that represents the development per day in the ordinary egg.

The red line or the red curve across the bottom of the chart represents the heat consumed per egg per day because of the evaporation of moisture. It takes a certain number of units of heat to evaporate a given amount of water, and if we put an egg in an incubator and maintain a certain temperature on the incubator, if that egg is not fertile, so it develops no heat of its own, it will never get up to the incubator temperature until the water is evaporated, and that is a sizable amount of heat when considered in a large mass of eggs.

This heat absorption, due to the evaporation of moisture, is sufficient so that it keeps the eggs at a sub-normal or sub-incubator temperature, until you reach a point where the heat development crosses the heat absorption curve. This is approximately the tenth day. It varies with individuals. You will note that the heat absorption is comparatively uniform until about the 19th day, at which time the chick pips the shell; somewhere during the 19th or beginning of the

20th day, they pip the shell, and as soon as they do, they begin to breathe by the mouth. From that time on, the evaporation is much more rapid, and when they roll out of the shell, they are quite moist, and evaporation ends quite rapidly. That evaporation is a chilling process from the very first, of course.

[fol. 71] At about the tenth day the amount of heat which is generated by the egg exceeds the amount of heat which is absorbed by evaporation. And that is about half way through the incubation period with respect to the incubation process.

I have termed the eggs that are absorbing heat as endothermic eggs. That means that they need heat, they are picking up heat. The eggs that are giving off heat are called exothermic eggs. I have colored here the heat that will be absorbed. I have graphically shown the heat that will be absorbed during the first ten days, and I have also graphically shown the heat that will be given off during the latter half of the hatching period.

The amount of heat which is given off—comparing the amount of heat which is given off, that is, the heat which is over and above that required for evaporation—the amount of that heat compared with the amount of heat that is necessarily absorbed is several times greater.

There is a line across on this chart at about the 17½ day. The purpose of that line on the chart is as follows:

In the James way incubator, they recommend that the eggs can be removed from the incubator at the 17½ to 18th day, and that was put in there to represent that period, and to show that the red area, or the heat given off up to that period, was still considerably greater than the heat required by the heat-absorbing eggs.

That is to say that even where the eggs are taken out of the incubator at 17½ days, there would be an excess of heat given off over the heat that is required to supply the endothermic eggs.

[fol. 72] Those dot-and-dash lines which appear beneath by coloring represent the amount of oxygen consumed and amount of carbon-dioxide given off. An egg passes from the endothermic, that is, heat-absorbing, to the exothermic stage about the tenth day. That varies with individual cases. I have another graph or chart which shows heat development in the egg.

The graph or chart identified by the witness as above was then offered and received in evidence and marked Plaintiff's Exhibit No. 3.

This chart which has just been handed me shows the heat developed by incubating eggs. Before looking at the chart, I wish to call your attention to the picture that is attached to the chart. That picture is taken of either this box or a similar box (showing box to the court). Within the box I have placed a dozen eggs. I will get back to this stage a little later. Through the side of the box I have placed a fever thermometer or clinical thermometer, and then the box was sealed. You will note that the box is heavily insulated.

Before starting this experiment or test, I place this box, empty, within the incubator, and I leave it there for at least 12 hours, so that the box would take on the temperature of the incubator as nearly as possible. Then, at a given period or given time, I would take 12 eggs of a known stage of incubation, and place them in the box, as shown there. The fever thermometer I would cool and shake down so that it was down to at least 90. Understand, this is all taking place inside the incubator, where the temperature is 99. Placing in the box 12 eggs of known stage of incubation, seeing the thermometer was down to at least [fol. 73] 90, then I would close the box, seal it and leave it on the floor of the incubator, where the air temperature around it was just the same as it had been around the eggs for hours.

As to how I get the temperature down to 90 when it is naturally 99—

The fever thermometer, you could touch it to your lips, or in any water, and hold it under a fan, and the cooling action of the evaporating moisture would soon put it down to the temperature of your incubator, and you could shake it down below the recording point.

Now, within 30 minutes after the box was sealed, I would read the temperature of the thermometer, and then, 30 minutes later, I would read it again, and so on for a nine or ten-hour period. If the eggs within this box were developing any heat, that heat would be confined in there for all practical purposes; it would be confined, could not escape, and the temperature of the thermometer would rise.

Now, with that explanation, I would like to call your

attention to the chart itself. On the left-hand column here I have listed the number of days that the eggs were in the incubator at the time they were subjected to this test. The first line at the top, they were in there three days.

30 minutes later—

The Court: You mean they had been in the incubator three days before you put them in the box?

The Witness: They had been in incubation in the regular manner.

[fol. 74] Q. That is, they were three-day old eggs?

The Court: Yes; all right.

The witness resumed: 30 minutes after they were placed in there, the fever thermometer—or 30 minutes afterward, the fever thermometer had a reading of 98.1. 30 minutes later, or in a one-hour period, it was 98.2; and during the remainder of the nine hours in which we kept this record, there was no further increase in temperature. Now, that 98.2 is below the temperature of the incubator. The temperature of the incubator during all this test was 99.

Now, at the sixth day period, after it had been in there for 30 minutes, the temperature was 98, and at a later period we had a reading of 98.1, but that is as high as it got. The nine-day period, after it had been in there for 30 minutes, it was 98.4, and that did not increase until at the end of the nine-hour period, when it registered one-tenth degree higher.

On the ten-day eggs, we began to see heat development, being 98.3, 30 minutes after it was placed in the box, but it reached 99 after it had been in there seven hours, and by the time it had been in there eight hours, it was 99.1.

Now, the intervening days from the start of the hatch up to the tenth, records were taken on each day, but they are not recorded here because they showed the same characteristics as are shown in this chart for the three, six and nine-day eggs; but beginning with the eleventh day, we have considerable heat developed.

On the twelve-day eggs, you will note that the temperature, in nine hours, rose to 100.4. On 15-day eggs, you [fol. 75] will note it raised to 103.6. On 17-day eggs, it rose to 107.3. On the 18 and 19 days, you will note that it did not get as high, only reaching 104.6 on the 18-day,

and 104.3 on the 19-day. That is the point of this depression in my heat unit curve on Exhibit 3.

On the 21-day, you will note that there are two records made there. The first one was made on fertile eggs that had not pipped at the time they were started. These would be put in on the morning of the 21st day, and in that condition, the temperature rose to 107.6 in nine hours; but if the eggs had pipped at the time they were placed in there, we found the temperature went up higher.

I have performed experiments corresponding to the eggs not pipped, and also eggs pipped, when the temperature ran up even higher than 111 in a shorter period. The amount of heat development would vary. This shows that prior to the 10th day period, the eggs are cooler than the incubator temperature, requiring heat. Heat must be added, but after that period, the eggs become exothermic and give off heat. And that is true of the eggs as far as the 17th day.

The chart thus identified by the witness showing heat developed while incubating eggs was then offered and admitted in evidence and marked Plaintiff's Exhibit No. 4-A.

Counsel for the plaintiff likewise offered in evidence a photograph of the apparatus used in making the demonstrations by the witness, which photograph was admitted in evidence and marked, Plaintiff's Exhibit No. 4-B.

The hearing was thereupon adjourned until January 30, 1934, at 10:00 A. M.

[fol. 76] The hearing was resumed on January 30, 1934, at 10 A. M., with the same appearances as before.

JOSEPH INSKIP TAGGART

The witness, Joseph Inskip Taggart, being recalled, resumed the stand and testified in substance as follows:

Direct examination.

By Mr. Ely:

I am familiar with the condition of the prior practice and the state of the art of incubation before 1915. I became acquainted. because, well, as a boy I saw incubators in use in my home vicinity, and while I was in college, in 190[illegible]

1908 and 1909, I used incubators for the purpose of hatching eggs in the department, there, of zoology, where we were studying embryology; and since that time I have watched the development, from time to time, and since 1922, I have made numerous studies of the early incubators. Asked as to the condition of the prior practice and state of incubation prior to 1915, the witness said: We have been hatching eggs artificially as long as we have history. The Egyptians and the Chinese used artificial incubation as much as two thousand years ago. Much of the early practice back there is shrouded in mystery because they have kept many of their practices secret; but in 1915 the incubators that were in common commercial use were small cabinets when compared with the incubators of today. The average incubator would hold perhaps 150 eggs, some of them going up three to four times that much, but that would [fol. 77] be a fair estimate of the average incubator of that time. In those incubators the eggs were all placed at one level. I mean by "one level," they were placed in a tray just one egg deep. The eggs were scattered over the tray, and this tray was placed in the incubator, which was a cabinet, perhaps 10, 12, 14 inches high, depending upon the make, and might be 30 inches wide, and 24 to 30 inches deep. It was customary for them to stand on legs, somewhat like a table. The heat in these incubators almost universally was applied from above, as they had heating pipes above the eggs, and there was no air movement in these incubators except that produced by convection currents or by ventilation. The eggs were all set at one time, and they were kept in this machine until the entire hatching process was finished; providing they had just one machine, that was their method.

The temperature in these machines was decidedly different from the temperatures in the force draft machines. The thermometer hung above the eggs was from 102, the first week, it might be, and 103 the second week, and 104, sometimes 105, the third week. That is, it was customary to increase the temperatures of these incubators as the hatching progressed.

Now, a thermometer hung below the eggs was anywhere from six to eight degrees colder than the thermometer above the eggs. In other words, there was several degrees difference in temperature between the bottom of the incubator and the top of the incubator.

The top surface of the eggs was naturally warmer than the bottom surface. Of course, it was customary to turn [fol. 78] these eggs at regular intervals, and one of the reasons advanced for turning the eggs was that it was necessary to warm the eggs uniformly. One of the Eastern colleges put out a bulletin on that about 1912, in which they recommended turning the eggs six to eight times a day, the reason being that it would warm the eggs more uniformly. That can be well illustrated by a bulletin that was put out by the United States Government in 1914. I have a copy of it here (producing). This is called Farmers' Bulletin 585, entitled "Natural and artificial incubation of hen eggs," and is edited by the United States Department of Agriculture. This particular copy came from the printing office in 1922. On the inside of the cover sheet it states that it was issued May 8, 1914, and this 1922 is a reprint. On the first page, on the cover page, it shows a typical incubator. In this particular one it shows the drawer removed, showing the chicks hatching and some eggs and egg shells left in there.

Now, if you will turn to page 12, you will see there a picture of the incubator cellar as the experimental form of the Bureau of Animal Industry at Beltsville, Maryland, showing an arrangement of incubators, men testing eggs, thermometer for reading of temperature of the room. You will note that there are six or seven incubators shown. Those are typical incubators of that day.

Now, just to leaf through this bulletin hurriedly; it will give you some idea of the methods of operating. Opposite page 12, there, on page 13, it gives you the temperature to operate the incubators.

It says, "When the bulb of the thermometer rests directly [fol. 79] on the eggs, the temperature is usually held at 101½ degrees to 102 degrees Fahrenheit the first week, 102 to 103 degrees Fahrenheit the second week, and 103 degrees Fahrenheit the third week. While a hanging thermometer is operated at about 102 to 102½ degrees Fahrenheit the first two weeks, and 103 degrees Fahrenheit the last week. At hatching times, the machine will frequently run up to 104 to 105 degrees Fahrenheit without any injury to the chicks."

These incubators required special care and skill in operation. At the bottom of page 12 it states "incubators

quire careful and regular attention which, though simple, is very exacting."

The results usually obtained with this type of incubator varied perhaps more with the operator, due to the operator, than to the particular machine itself. An operator could become skilled with most any machine and get good results; if they gave it very careful attention, they could expect a 50 to 60 or 70 per cent. hatch, depending upon conditions.

The practice with regard to the period of setting the eggs in this incubator was—the eggs were all set at one time; that is, I mean to say you did not have staged incubation. In the summary, which is on page 18, it states, "Do not add fresh eggs to a tray containing eggs which are undergoing incubation." There was a practice of cooling the eggs that was carried on in this type of incubator. In the same summary it states, "cool the eggs once daily, according to the weather, from the seventh to the nineteenth day." It was customary to cool them at least that often, and many [fol. 80] operators cooled them twice a day. The cooling process consisted of opening the door and drawing the tray partially out that sometimes as much as two-thirds of the tray extended out into the room. In other cases, the tray was drawn out entirely and placed on top of the incubator. It was left there from 10 to 30 minutes, depending upon conditions and depending upon the wishes and skill of the operator. Some of them would cool much longer and much more severely than others. The condition of the air within those incubators of this type was that it was still air. There was no movement of the air except by convection currents. The top of the incubator was several degrees warmer than the bottom of the incubator. There was very decided prejudice, that I know of, against drafts. Every precaution was taken to avoid drafts, and they even built special incubator houses or incubator cellars that were built so that they would avoid drafts, even then; on page 11 of this bulletin it gives you a description of the incubator cellar or house, and towards the bottom of that paragraph, it states, "muslin screens on the windows provide good ventilation without draft and at the same time keep the sun from shining on the machines."

It was not possible, in these machines, to practically incubate eggs arranged at different levels, because there were no drafts and they depended upon convection currents

solely. The incubator had decidedly different temperatures at different levels. For example, if we have a temperature of 102 to 103 directly above the eggs, we might have a temperature of 97 below the eggs, and if we would operate the incubator right for one layer of eggs, we would [fol. 81] not have the right temperature for the layer of eggs below it or the layer of eggs above it. Many people tried this, and there was a lot of people thought they had the problem solved, but none of them ever became practical, and there was none of them ever used that I have been able to discover. That is, it was not the practice then to hatch eggs by arranging them at different levels in the incubator. Whether the eggs were shifted or not from either position did not make any difference.

(Counsel for the plaintiff then offered in evidence the bulletin referred to by the witness, which was admitted in evidence and marked "Plaintiff's Exhibit No. 5.")

Other than this bulletin which I have spoken of and showing commercial incubators of the period, I have here a photostatic copy of an advertisement that was put out by the Buckeye Incubator Company in 1915, which shows electrotypes that the Incubator Company could furnish people that were selling these incubators. It states here that they have seven sizes, 60 to 600 eggs. You will note the general style of these incubators: There was only one layer of eggs. They were all lamp-heated. That was not true of all the incubators that were cut; some of them were elctrically heated, but these shown here are all lamp-heated, but that is typical of the small incubators of that time.

Now, there was a number of so-called mammoth incubators at that time. The large number was gained by connecting together a lot of these separate incubators, much as you would connect sectional bookcases. They would deck [fol. 82] them up on top of each other, one, two, three and four decks high. I have an illustration of that, that was put out by the Blue Hen Incubator Company. Here they have quite a number of individual incubators connected together. Each door as shown there represents a separate incubator. Each one has its own thermostat, own ventilation system, own moisture system, and was a separate incubator in itself. They did use, in this case, a unit heater in which they had the same hot water heating plant that supplied heat to

each of the separate machines. Now, there is another feature about this Blue Hen that I want to call your attention to, and it represents a condition in the development of the art. I have stated before that it was customary to carry the temperature in the incubator different each week; that is, change it as the hatching progressed, and in this machine it was recommended that they adjust the temperature right in the top deck for the first week, and in the second week they would move them to the second or middle deck, and the third week they would put them in the bottom deck. You will even note that the bottom deck is deeper than the other two. The reason there was to put in an extra tray below the tray of eggs that you see, for the chicks to go into after they had hatched, and they would keep them in there for a few hours after hatching. They called it a nursery tray. That was a common practice, not only in 1915 but for a number of years afterwards. This particular illustration was prepared in 1922. That was typical of the earlier installations. In those installations, in each cabinet, the eggs were all the same age. There was no connection between [fol. 83] the cabinets whatever, outside of the heating pipes. There was no connection as far as the heat from the eggs in later stages of incubation going up to eggs in the earlier stages; there was no utilization made of that.

By the Court:

Q. There could not be differences in temperature in those three layers?

A. Yes, sir.

Q. Well, how would you take your eggs from the bottom layer; the first week, and the third week, they would be in the middle layer, which would be, perhaps, a cooler temperature instead of a higher temperature?

A. They would be in the top layer the first week, the middle layer the second week, the bottom layer the third. That was largely offset by the circulation of the water; the water that they were using for heating these cabinets, the warmest water would go to the top.

Q. In other words, you do not put them all in at one time; you put them in separate weeks, the eggs?

A. Yes, sir. As they would start, they would fill the top deck, and then, the second week, they would move those down to the second deck and set a new batch in the top

deck, and then, the third week, they would move them down to the bottom deck.

Q. In that way, you could not fill all three decks at one time?

A. No, sir.

By Mr. Ely:

There was no communication, as far as the transfer of heat, from the eggs in the lower series of cabinets up to the eggs in the other cabinets. That is, the heat in each cabinet and the air condition of each cabinet was individual to [fol. 84] that cabinet, and individual to that age of eggs that was in that cabinet. That cabinet has its own thermostat and own controls. The hatching was carried on in this lower series of compartments. That is, it was not new to hatch eggs in a separate compartment from that in which the major portion of the incubation operation took place.

Asked in what respect this prior art resembled or differed from the practice of the hen on the nest, the witness said: They simulated the hen, copied after the hen in every way that they could. It was the teaching of the time that an incubator had not been built or could not be built that would be superior to the hen in her nest. She sat on eggs all of thhe same age. Her body was around 105 to 106 at the start. She warmed the eggs from above. The temperature below the eggs was considerably cooler than her body, and she avoided drafts by keeping the eggs closely covered; and she would leave her nest once or twice a day for food and water, during which time the eggs would be cooled, and she would turn them by a shuffling or rolling process with her feet or beak. She conserved moisture by keeping them covered all the time; and the early incubators did everything that they could to follow the hen. They used the hen as their model, and the literature regarding incubators at that time, and even after that time, among the people who were manufacturing this type of incubator, talked about how they follow the hen, how they follow Mother Nature.

Counsel for the plaintiff then offered in evidence the electrotypes of the Buckeye Incubator Company, identified [fol. 85] by the witness and the same were admitted in evidence and marked "Plaintiff's Exhibit No. 6".

Counsel for the plaintiff then offered in evidence the electrotypes of the Blue Hen, multiple deck incubator identified by the witness and the same were admitted in evidence and marked "Plaintiff's Exhibit No. 7".

The Witness then resumed:

As to this defendant and its practice, it early followed this type of incubator construction which we have shown in Exhibits 6 and 7. I have literature showing what this plaintiff used to do. I have catalogs that were supplied to us by the defendant. The oldest one here goes back to 1924, or at least that is the date—yes, it is copyright in 1924; and is the last one in the—the back one—this blue one, on the inside page, it states it was copyright in 1924. On page 4 it shows a type of incubator that they were marketing at that time. You will note this one was four decks high. It differs from the others in regard to ventilation, slightly. There is no space in between the decks; one deck sits directly on the other. That incubator there is known as a 23,040—egg machine. The individual compartments were 180 eggs apiece. This James Way Incubator Book is known as the 64th edition, and is dated May 14, 1928.

The Court: Fourth edition, issued 1927, it says.

[fol. 86] Mr. Ely: I guess it is the same; perhaps a reprint, your Honor.

The Court: It says 1927.

Mr. Ely: Well, it does not make any difference, 1927 or 1928. I guess you probably have a different edition. It is the same thing, I think.

The Court: It seems to be the same.

The Witness: On page 4 they show a picture of the same machine, but the cross-section Mr. Ely referred to is shown on page 27 of that book. This cross-section is labeled as "End section of the James Way with manifold housing removed showing the vertical air shaft and fresh air intakes".

You will note that this shows four separate machines. There are four separate incubators. The ventilation shaft is up the center, and there is entrance into each machine and into each cabinet at the bottom, and the arrows indicate the convection air movement that crosses up through the eggs and passes out at the top. This ventilation is controlled by the damper on the outside of each section.

There were convection currents that went through there, convection currents only—no forced draft, none whatever. The eggs were all at one level and they were all in the same stage of incubation. The heat was applied from above. Ventilation and cooling from below. The eggs were not hatched in different levels; they were not arranged in different levels in the cabinet. Each cabinet is individual [fol. 87] and separate from the others. They advocated at that time, 1928—this defendant advocated following nature's way, vigorously. I will point out in the catalogs where they talk about following nature's way, and also where they condemn forced draft. On the top of this page 27, it states, "Nature's way of supplying fresh air", and at the fourth paragraph it states "the air movement in this shaft is continuous, natural and certain, making it unnecessary to use electric fans or other mechanical devices of any kind."

Now, if you will just turn back one page, to page 24, you will note right at the top of the page, "as Mother Nature intended, heat from above, moisture from below, ventilation from the side."

Now, this same statement appears in a number of catalogs. For example, in the very next catalog, which has a green back, if you will look at the back cover page or on the inside of the back cover page, it states in a bold type "as Mother Nature intended, heat from above, moisture from below, ventilation from the side."

In one of their very latest catalogs, which is the first one in front of the orange or the yellow one that we have just been looking at—in the right hand column of page 33, which is entitled "abundant fresh air", in the second sentence of that, it states, "in the James Way the air is gently moved through the compartment without draft".

As to what date these defendants were sticking to the old still air machine and knocking the forced draft machine—well, since 1929 they have been manufacturing both types. [fol. 88] This latest catalog which I have just read from is describing the conditions as existed in the still air machine. And they were finally converted to this forced draft machine about 1929. The Smith incubator, as it is now sold, had then been on the market about seven years, but incubators under the patent had been on the market for twelve years. And during all this time, these people opposed to

the forced draft machine, as I have shown. I have some bulletins that they put out about that. This bulletin is entitled "Profits in Baby Chicks, or How to Conduct a Successful Hatchery." It was edited by Dr. J. C. Crum, who at that time was manager of the Poultry Division, Elmira, N. Y., branch of the James Way Farm Engineers and James Way Manufacturing Company. It is copyrighted by James Manufacturing Company in 1924.

I call attention to page 10, which started out with, "What Type of Incubator" and in the second paragraph it states, "There are two distinct types of incubators, and each one has its own following. The sectional incubator is well known and has been proven over a period of years. This type of incubator more nearly approaches the natural hen method, and will turn out a chick of highest quality. The air enters the bottom of the egg compartment, the heat is supplied from above, and thus the top of the egg is always warmer than the bottom, thus duplicating the method of nature.

This type of incubator is simple to operate, is flexible and elastic, to meet the operator's growing needs; is devoid of electrical and mechanical devices, hatches chicks in large numbers; and last but not least, the chicks produced are of [fol. 89] a quality calculated to please the purchaser and prove a lasting advertisement to the hatchery man. The James Way represents this type in its highest form of development.

Then there is the cabinet type of incubator. The cabinet type is a large cabinet or chamber in which the eggs are suspended in trays or hangers of various kinds. This type requires the installation of an electric fan in the top of the chamber to drive heat downward, to maintain as near a uniform degree of temperature in the cabinet as is possible in this type of machine. This means the same temperature on the top and bottom of the eggs, which is contrary to Mother Nature's method, and which manifestly affects the quality of the chicks. It also requires an uninterrupted electric service and the expense of current." That comparison between the two types was published by this defendant in 1924. That picture shows Dr. Crum standing beside the type of machine most nearly equal to the natural hen method of hatching. There were two schools of thought in this problem of artificial incubation. Prior to 1915 there was just the one school of thought, and that was

to copy Mother Nature as closely as possible, as described in this James Way incubator. The other school of thought was started by Dr. Smith, in which they were placing eggs in columns in the machine, had different layers of eggs, and had the eggs in staged incubation, and applying forced draft through the machines constantly.

In the early stages, there was considerable discussion along both lines. This defendant persisted in the Nature method or the hen method until 1929. Then, in 1929, he [fol. 90] shifted over to the other school of thought. As to those who adhered to the first school of thought, or Nature school of thought, as a practical matter, they practically all have passed out of business. There are very few of them still operating, and those that are, are not doing very much in that line. Several of them have gone out of business in the last two or three years.

Counsel for the plaintiff then offered in evidence this booklet, and particularly the cover page and page 10 of this booklet to which the witness has just referred and the same was admitted in evidence and marked "Plaintiff's Exhibit 8".

(Bulletin entitled, "Profit in baby chicks, etc.," marked "Plaintiff's Exhibit No. 8.")

The Witness then resumed:

When these incubators were built up in the sectional bookcase form, the disadvantages of that scheme of getting large production were, well, they took up so much room, as even in the four-deck machine, there could only be eggs arranged at four different layers, and it covered a large area. That is, to get any capacity of any consequence, it covered a large area; and one of the principal disadvantages was that it required a special building of houses; you could not have the sun shine on the machine, and you could not have drafts on the machine. If drafts blew against one side of the machine, it would cause a difference in temperature in [fol. 91] there. They depended solely on convection currents to keep the temperature uniform at the different levels in the machine; so it was the custom to build special incubator houses or incubator cellars.

Then the heating problem was quite extensive. It required considerable fuel, not only to heat the building but

also to heat the incubator. It required lots of labor, in that each individual compartment had to be checked and the temperature had to be regulated in there, and it was customary to start the rounds every few hours and read all the thermometers, a thermometer for each 150 to 200 eggs in the machine. It was the practice, in most of those machines, to cool them once or twice daily, and it required hours in incubators of any decided capacity.

I am familiar with the Smith Patent in suit. I have made a special study of it, and I have testified regarding it in different patent litigations, and am familiar with the patent. This patent calls for an improved apparatus and method; is designed particularly for extensive operations wherein they have a chamber of large dimensions. It calls especially for eggs arranged at different levels and eggs in different stages of incubation, and for the application to those eggs of a forced draft, not an ordinary draft, but a draft of sufficient velocity to keep the temperature substantially uniform throughout the cabinet.

Explaining the meaning of "arranging the eggs at different levels," the witness said: Prior to this patent, or prior to Dr. Smith's work, no one had successfully been able to arrange eggs at different levels in the same cabinet. There had been many attempts at it, but no one had been [fol. 92] able to build a successful incubator where they had eggs at different levels in the same machine. In the old style machines they could not do that, because convection currents would keep the temperature different at different levels; and Dr. Smith overcame this by putting eggs in there in several different levels, and then applying to those a draft of air that would keep the temperature the same on all sides of the egg, which was the reverse of the teaching up to that time, the reverse of the teaching of nature.

When the incubator is filled, the eggs are arranged in columns, or in stacks. The trays are in stacks, so that there may be quite a number of different levels. Dr. Smith has built them as many as 22 levels high—that is, in tiers, I mean. That is what I mean by "arranging in different levels". Staged incubation means that there are, in the machine, eggs in different stages of incubation or different stages of hatching. It was not the practice, prior to Dr. Smith's invention, to put the eggs in the incubator in dif-

ferent stages of incubation. They all had to be the same stage, because they thought it was necessary to change the temperature as the incubation progressed; and you will remember, the Government Bulletin cautioned them against adding any fresh eggs to the incubator after it had once been started.

When the incubator was full, you would have eggs in several different stages of incubation, as outlined here; you would have eggs in four to five different stages of incubation.

With regard to circulation of air: Commencing with line 40 on the first page, it states:

[fol. 93] "The temperature of circulating air should be such as will prevent the eggs in the early stage of incubation from falling below 100 degrees and the speed or velocity of the circulating air should be such as to carry the heat away from the eggs in the later stage of incubation and thereby hold the temperature of those eggs at 105 degrees or slightly below that. It is manifest that the temperature will remain practically the same throughout the column of eggs, but the air is impelled with sufficient velocity to carry the heat away from the eggs which happen to be in the advanced stage of incubation."

The eggs in the earlier stages of incubation, when they are subjected to drafts, are warmed by the heat that is given off from the eggs in the later stages, and the converse is true: The eggs in the later stages of incubation are cooled by the heat-absorbing properties of the eggs in the earlier stages. That is a useful function, as far as eggs in the later stages of incubation are concerned, that is, the cooling effect of the cool eggs—very much so.

By the Court:

Q. It says here, "The air is impelled with sufficient velocity to carry it away from the eggs which happen to be in the advanced stage of incubation." Now, is it carried away at a greater velocity where the eggs are at an advanced stage of incubation than it is in the case of those in the less advanced stage of incubation?

A. The warmer the egg, the more rapidly it will give off its heat to the air that passes over it.

Q. Then that tends to increase the circulation of air against the eggs in the more advanced stages of incubation? [fol. 94] A. Not necessarily, no. That is, the air circulates uniformly, or with comparative uniformity throughout the machine.

The Witness resumed under the direct examination by Mr. Ely:

That current of air carries heat away from all of the eggs that are giving off heat. The age of those eggs is from the tenth to the eleventh day. Any eggs that happen to be in the cabinet, that are cooler, will pick up heat from the air, as the air picks up heat from warmer objects and the air is moving, diffusing together, and the heat units will be given up to the cooler objects. I say any eggs that happen to be in the cabinet, that are cooler; the eggs that are there in the cabinet that are cooler are those that are under the ten-day period of incubation. That is, in carrying out the Smith process, you have eggs that are cooler, eggs that are absorbing heat, and eggs that are giving up heat.

In the preferred method as described by Smith, he places the cooler eggs in the top of the cabinet. That is, he set his first eggs in the trays at the very top, and these eggs were left in horizontal position, because at that time it was the teaching not to turn the eggs the first few days. It was not considered necessary, and it is not necessary yet today, but it has become general custom to do it, but they were not turned, and they were put in that position, and then, as the turning racks immediately follow—these are perhaps shown better in Fig. 3, where those from the horizontal trays at the top were moved into the trays immediately below, and at certain periods, it was Smith's [fol. 95] plan, in his preferred apparatus, to move those downward, and in the last three days they occupied the bottom of the column, where they could hatch out without dirting up any eggs below them. At the time of hatching there is considerable dirt there, such as droppings from the chicks and particles of shell.

By the Court:

Q. How were the eggs moved in the crates? I can see how the crates are shifted, but it does not occur to me just how the eggs themselves are turned in the crates.

A. There are individual trays, as you will note at the bottom in Fig. 2 on the first page. These trays were a mesh bottom tray, and you will note that the eggs are placed on the little end. Smith was the first to recommend this general practice of placing or traying the eggs on the little end. Then those trays were slid in the racks, and when the trays are level, as shown in the central column in Fig. 3, the tray can be pulled in and out without any difficulty; and if the tray is pulled out, you simply have the receptacle there, the same as a bureau if the drawers are taken out.

Q. How do you turn the eggs?

A. The turning is accomplished by pulling down one side of this rack. You will note that these racks here are pivoted at the top, and there are side members to that rack which are again pivoted on all the cros members, and you can pull down one side and one side goes down, the other side goes up.

Q. I still do not see how you turn the eggs?

[fol. 96] A. When first placed in, they are standing on the little end. Now, if you pull one side down, the egg will then be standing at approximately a 45 degree angle on the little end, and when it is pulled down to the other side, it flops over to the other angle, making from 75 to 90 degree turn. The illustration shown here does not give it that much of a turn, but that has always been the practice.

The Witness resumed under direct examination by Mr. Ely:

Now, that is imitating the shuffling of the eggs on the nest by the hen. It accomplishes the same purpose. Smith was the first to do that, however, in any quantity. As a mattter of fact, he has a patent on this very device.

I said that in the old style incubator, you turned the egg over to expose it equally to the heat that was coming from above. That is, the heat was applied from above, and so you turned your egg over like you turn a pancake over. In the old style incubator that had other purposes than simply turning the egg over. That was only part of the story. It is necessary to disturb the egg, turn it from one position to another, in order to have the embryo developed properly.

Now, it is possible to hatch some eggs without turning during the entire period, but your hatch is greatly in-

creased if you do disturb them and turn them from time to time, even though the heat is kept proper all the time. So that there are two reasons for turning the eggs, or exercising the embryo, as it is sometimes referred to.

In both practices, or under the old art there were two [fol. 97] reasons for turning. In Smith there is only one reason for turning. That is to exercise the embryo, or to prevent the embryo from becoming stuck at one point. It develops much better if it is disturbed in the shell from time to time. The other reason does not apply with regard to Smith, because we have heat uniformly distributed about the egg all the time; that is, the top of the egg and the bottom of the egg are the same temperature. Now, with regard to the division of the eggs between endothermic and exothermic eggs, I mean by those terms, just for the sake of the record, endothermic eggs are eggs that are taking up heat. That is, they require heat to keep them up to incubating temperature. Exothermic means they are giving off heat; they have to be cooled.

Referring particularly to Exhibit 3, as a matter of illustration, in the Smith structure, in the Smith preferred method as shown, or preferred apparatus, there are approximately half of the eggs that are in the endothermic period, or in this period when they are requiring heat, absorbing heat, and there are the other half of the eggs that are in the exothermic; they are giving off heat.

Now, in the condition where you have eggs from one to 21 days in the same cabinet, there is very much more required, or very much more heat given off by the eggs in the exothermic stage than there is heat absorbed by the endothermic stage. So that you have a great deal more heat given off by the hot eggs than is required to bring the cold eggs up to and maintain them at incubating temperature. And that is a great deal of excess if you carry them the full 21 days. If you carry them in the cabinet too, say, 17½ [fol. 98] days, you still have excess heat over that required, to bring the earlier eggs up to and maintain them at incubating temperature. As to this matter of the air circulation, secured in the Smith machine, in this preferred apparatus that is illustrated here by Smith, he circulated the air by means of propeller fans. These fans were placed in the top of the cabinet, near the heating pipes. The heating

pipes are shown on both sides of the fan. The air was caused to circulate down the corridor to a point near the bottom, where it passed into the egg chambers at each side. Thence it would move upward through the egg chambers and back into the fan compartment, where it would be recirculated.

Asked to show how the circuit is completed, the witness said: On the second page of the patent, starting in with line 18, it states, "The longitudinal space 21 above the fans has open communication above the side walls 22 with the upper ends of the rack compartments behind the curtains 3 and 4."

While that communication is not shown clearly on this Fig. 1, yet the patent states that there was an open communication between the egg compartments and the compartment immediately around the fan. The space where the air returns to the fan chamber from the column of eggs is on each side of the fan compartments and is directly over the supports that are shown on each side of the fan compartment. It is not shown clearly here in this, but it is stated that they are there, and the arrangement is made so the air passing up through there, up through the egg compartments, is drawn back into the fan and recirculated

[fol. 99] Now, there is a provision for a certain amount of this air to escape through the opening 28. Now, there is only one of those openings above each egg compartment. Just a brief reference to Fig. 3 shows that there is only one opening 28 above the egg compartment, and that, of course, is a very small portion of the ceiling above the egg compartment.

Now, immediately above the fan there is an opening for the intake of fresh air. You will note that there are two slides, one shown on either side, and it shows this opening decidedly restricted. Now, those are adjustable so that the amount of air that the fan is continuously taking is controlled.

Now, of course, only as much air can escape as fresh air is taken in. That is, if the slides above the fan were completely closed, there would be no escape through 28, as all the air would be circulated over and over again.

A certain amount of fresh air is necessary for supplying sufficient oxygen and carrying off the carbon dioxide, but the amount of fresh air must be controlled. If we took in

a complete charge of fresh air all the time, and blew out through the corridor, and out through the egg trays, and then out of the incubator, it would require an immense amount of heat, and would require very special apparatus to hold the temperature proper, and then what is still greater, it would be a very expensive problem to keep the humidity of that air at the proper place. The humidity of the air in the incubator is very much higher than the humidity of the air in the average room, and in order to maintain that high humidity, it would be quite expensive; [fol. 100] and so, rather than blowing all that humidified air out, the humidified air is worked over and over again, in repeated cycles, only adding as much fresh air as is necessary to keep the oxygen contents proper.

Now, Smith also provided a moisture jet in the fan compartment. This moisture jet, as he supplied, it, was of steam. There was live steam entering there, and the amount of live steam that was brought in was controlled so that it was sufficient to humidify this equal amount of fresh air that came in.

Now, in actual operations of our present machines, the amount of fresh air that is taken in on each cycle is only about one half of one per cent. of the air that is being in continuous operation. Now, this per cent. is varied from time to time, sometimes as much as three per cent., but it has always been quite small. In the earlier history of the practice of the Smith incubator, the percentage of air interchanged was considerably greater than it is today. It was perhaps two to three per cent., constantly. Smith was using steam for humidity, and he could supply it in any quantity he wanted to, and the exchange or the fresh air coming in was about three per cent.

The eggs themselves supply some of the humidity. The evaporation of the moisture from the eggs is quite a factor. It is very important that it be controlled, as you can not evaporate rapidly a part of the time and then slowly another part, successfully. The plan is to control it within certain limits all the time; that is, moisture that has once evaporated from the egg cannot be put back into the egg again. And yet you have the problem, in this incubator of [fol. 101] supplying fresh air. There was reference yesterday to the matter of conservation of moisture; how the moisture is conserved in the Smith machine. The phrase

was used "whereby the moisture is conserved,"—that moisture is conserved by controlling the amount of fresh air that is taken in and holding that down to a point where we do not carry out an excess of moisture out of the machine. That is, if you carry out an excess of moisture, you might be in danger of drying the eggs too fast for successful incubation.

I call his Honor's attention to the point where the patent describes the regulation of air interchange. The percentage of air interchange is controlled by the regulation—line 43, on page 2: "The outlets 28 for the release of foul air are made of such restricted capacity as to prevent the undue escape of moisture." You get the control of percentage of air interchange by controlling the amount that is taken in. I call his Honor's attention to that point in the patent, that refers to that, page 2, beginning at line 39. "More or less fresh air may be taken in through the valved opening 24 above the space 21." In other words, the amount or percentage of air interchange is not fixed in the Smith patent. If the inlet opening is completely closed, no air will be discharged, because if you are not taking in any quantity of air, you cannot discharge it, but if you open it so that you are taking in 20 cu. ft. a minute, there will be a corresponding amount discharged. If it is 10 cu. ft. a minute, there will be, of course, the corresponding amount discharged, and you can control the amount of air that is going out of the machine either by throttling the exhaust or by throttling the intake.

[fol. 102] It does not make any difference in the actual operation as to whether you throttle the exhaust or throttle the intake. That is because the atmospheric pressure remains the same in the incubator as outside. The fact that you have a restricted outlet and are only interchanging a very small percentage of the air, means that all the air that is not exhausted must pass back into the fans and be recirculated. And in the normal operation of the Smith incubator, say, today, the percentage of the total volume of air making this recycle or recircuit is over 99 percent. of it. Over 99 percent. of the air goes around again through the machine, and repeatedly through it.

In a little earlier period of the operation of the Smith incubator, it varied from 98, 97 percent., sometimes smaller, or as much as 99 percent. It depended upon certain condi-

tions within the machine and within the room, outside temperature and things of that nature.

Asked what was the effect of the recycling of the air on the order and arrangement of eggs, the witness said: The fact that the air is being moved continuously through the columns of eggs and brought in contact with all the eggs—it makes no difference what the arrangement is, as to whether they pick up the heat or give up the heat to the air. It depends upon the temperature of the egg and the temperature of the air solely. If you have an exothermic egg at one point,—and the air naturally has to be cooler than the exothermic egg—the heat will be picked up by that air; and if you have at another point in the cycle endothermic eggs, heat will be given up to those eggs. It is, therefore, not necessary to carry out the transfer of heat from the [fol. 103] eggs in the later stages of incubation to those in the earlier stages of incubation. It is not necessary, in order to accomplish that function, that the air, as it leaves the fan, shall strike the oldest eggs first.

Asked what variations could be had in that arrangement, the witness said: If your air is moving in cycles, you have a propelling force at one point. That is not the start of the cycle, necessarily. It depends upon where you want to start in the cycle. You can have your hottest eggs at the top of the incubator. The air would be drawn right over into the fan and carried to the bottom. For example, if you had your freshest eggs at the bottom of the machine, they would naturally be the coolest. If your hottest eggs were at the top, that heat would be carried through the fan and down on to the bottom eggs that way. There are innumerable variations that you would think of, that you might have: hot and cold eggs sandwiched, or any particular arrangement that you wanted to. As long as the air is moving in substantially closed cycles, and moving with sufficient velocity, it will carry the heat away from the eggs that are giving up heat and will deliver it up to the eggs that are absorbing the heat.

By the Court:

Q. Well, under that same theory, you could put eggs of a different stage of incubation in the same tray, could you not?

A. Yes, sir, that has been done.

The witness resumed under direct examination by Mr. Ely:

It is not convenient, but it could be done. You could put those trays anywhere you wanted to, mix them up, I mean, [fol. 104] put them in any order you wanted to. It has been done. The heat is adjusted between the heat from the eggs and the heat that is turned on, that is what I mean. The circulating air is the medium for carrying the heat and keeping the temperature substantially uniform. Regulated as to the egg by the heat going out or coming in to the egg and contact with the outside air. Of course, in all practical operations, you have to have some controlling means, and it is customary in all machines to put a little bit more refrigeration into the machines than is absolutely required, and then have thermostatic controller of heat, to add just enough to keep it the right temperature. That is to say with that condition, there is a certain balance more or less evently maintained between the endothermic and exothermic condition of the eggs. You have to check the temperature of the air. That is, some heat may be lost by radiation or carried out by the small portion of air, or foul air, that goes out of the machine, some heat is taken out, and it is necessary to check that.

It is a fact, that the eggs in the later stages of incubation really do work, that is, really supply heat for the incubation of the fresher eggs. It is very decidedly a fact. In a cabinet machine of this kind, the fuel consumption is decidedly less than it is in the old style machine. There is another factor, that these heat requirements or the thermal characteristics of the endothermic and the exothermic eggs are fixed by Nature. That has a bearing upon successful incubation in this process. I will explain that a little. It is natural for the temperature within the egg to increase [fol. 105] slightly as the different periods advance, and this heat that is given off, we cannot take it all away from the egg. That is, the eggs in the later stages are warmer than the incubator, and we cannot take all the heat away. We can only cool it down to somewhere near the room temperature, or the incubator air temperature, and the eggs that are in the earlier stages, we cannot bring them right up to the incubator temperature, because they have a cooling, refrigerating action of their own.

Now, by circulating the air around all of them, we still maintain that characteristic in the eggs that the hen had, in which the temperature of her eggs would increase as the hatching progressed. The endothermic requirements of the eggs in the earlier stage of incubation are fixed by nature. The heat which is given off by eggs in the later stages of incubation is also fixed by nature.

Now, those two things being fixed, we make use, in this process of fixed laws of nature with regard to heat generation and heat absorption. Dr. Smith was the first man to put to use successfully that phenomenon of nature. It has been recognized for hundreds of years that it was present, but Dr. Smith in his patent, was the first to put that phenomenon to successful use.

Following out that idea about the order of arrangement of eggs, about affecting the heat transferring property of the current of air, it does not make any difference for practical results of the Smith method, whether the eggs are shifted or not during the process of incubation. The fact that the heat will transfer, regardless of position or location, it would be a natural corollary that it is not necessary to shift the eggs to different positions in order to carry out [fol. 106] the process. And so long as the eggs remain in the tiers or different levels, the arrangement of eggs, or the shifting of eggs, or non-shifting of eggs, or arrangement of eggs, with regard to carrying out the heat-transferring properties, it makes no difference on that part. It is simply a matter of convenience.

Incubators are made under this Smith Patent by the Smith Incubator Company of Cleveland, and by the Buckeye Incubator Company which has its factory at Springfield and now has its offices in Cleveland. Smith Incubator Company at the present time manufactures what is known as a 30,000 egg machine, a 39,000 eggs machine, a 52,000 egg machine and a 65,000 egg machine. The Buckeye Company, under this patent, manufactures sizes of less than 16,500 eggs; that is, they make a number of different sizes, but their license permits them an exclusive right under the patent to all sizes from 16,500 eggs down.

Now, with respect to the commercial Smith machine and the commercial Buckeye, the principle of turning the eggs is the same. It is not necessary to turn the eggs clear over. It is necessary to disturb them a certain amount so that

the embryo within the shell will shift, but the tilting racks that are used on the Buckeye machine are similar to those that are shown in the patent, and they are covered by a separate patent by Dr. Smith. In the commercial Smith incubator, we use a different method of suspending the trays. They are suspended on chains, but the tilting principle is the same. That is, an egg is turned to a 45 degree angle one way for a period and then turned to a 45 degree angle at another period, and the turning process takes place at different times daily.

[fol. 107] By the Court:

Q. I understand you to say it was not necessary to turn them.

A. It is not necessary to turn them clear over. It is necessary to disturb the eggs.

The Court: I understand your Counsel's question to be whether it was necessary to turn them.

Mr. Ely: I think, your Honor, I asked the question as to the shifting the eggs. What did you understand I meant by shifting the eggs during the process?

The Witness: I meant that it was not necessary to change the eggs from one level in the machine to another level during the process of hatching.

The Court: I understood you to put the question both ways, shifting and also turning.

Mr. Ely: No, I did not intend to, your Honor.

The Witness: Some eggs will hatch if they are not disturbed at all during the process, but we get a much better percentage of hatching if we do disturb them.

The witness resumed under direct examination by Mr. Ely:

Referring to the shifting of eggs, the movement of eggs at various stages of incubation in the column—it is not necessary that the eggs be shifted in that meaning of the word, in order that this heat transference may take place. It is not necessary to be put in at one level at one period and [fol. 108] then at another level for another period. And actual incubators are made and operated under this patent where the eggs are not so shifted from one position in the column to another while the incubating process is in progress.

Buckeye Incubator Company manufactures several machines, that is, several different sizes, where the eggs are put in these turning racks and left in there for 18 days, when they no longer need to be turned, and then they are taken out and put in trays where they are kept in horizontal position. I might say that, in these turning racks, the tray of eggs is never level unless it is being worked; that is, the tray of eggs is always tilted at an angle of 45 degrees. That is its normal position, either to one side or to the other; but when it is no longer necessary to turn the eggs, then they take them from the turning racks and put them into another position where the trays can be level and where the chicks actually emerge from the shell.

The Court: In the same enclosure, you mean?

The Witness: Yes, sir. Some of them are in the same enclosure; sometimes they take them out of that enclosure and put them in another enclosure for the hatching process of the chicks coming out.

Q. Now, in the turning process, in this type of Buckeye machine, after the tray of eggs is once set in the racks, is that tray of eggs moved until it is necessary to take them out for hatching process?

A. The tray of eggs is not moved to another level at all [fol. 109] until it is necessary to take them out. The tray is tilted in the turning process, but that is the only movement.

Q. Do you have a booklet of the Buckeye Incubator Company that touches upon that point, Mr. Taggart?

A. Yes, sir.

Q. You have not it there?

A. I don't have it here.

Q. Do you know where you can put your hand on it?

A. (Witness produces booklet.)

Q. Just call his Honor's attention to that; explain what this booklet is first, and the page you want to refer to, and so forth.

A. This is an operator book for the Buckeye All-electric Mammoth Incubator, Models 46-3, 47-3, 48-3, 49-3, 1931-1932 edition, put out by Buckeye Incubator Company, Cleveland, Ohio.

I call your attention to page 12 at the top of the page; it says "General operation of incubator: The incubator should never be filled to full capacity on any one day. The

eggs must always be set in the incubator in the following manner, and it is extremely important that these instructions should be closely followed. Each weekly setting will consist of one-third of the eggs trays in the incubator. Note accompanying illustration. First week, blue; second week, red; third week, white."

I might state that this blue, red and white refers to tags that they place on the trays so that they can tell what stage of incubation they are in. All eggs that are set at one week would be labeled blue, another week white, and another week red.

The Court: Why can you not put them in all at once? What is the reason you cannot put them all in at once?

[fol. 110] The Witness: If you were to fill the incubator in one day, it requires a considerable heat to bring it up to temperature and to hold it there for the first ten days, and after that it begins to generate heat and it is quite difficult to get enough refrigeration into machine to keep the temperature down, and it is not practical, from a commercial standpoint, to attempt to do that, and it has been tried repeatedly, but it is very difficult to control the temperature from 15th, 16th and 17th day.

Q. That is because all of the eggs in this incubator would then be giving out heat, is that true?

A. Yes, sir.

Q. And there would be no cold eggs in there to absorb that heat?

A. Right. Now, if you will go down just below the middle of the page, there is a paragraph: "The trays of eggs are to be remain as set and must not be moved nor location in the racks changed until the end of the 18th day or the beginning of the 19th day of incubation for each setting."

Q. Now, when that incubator is full of eggs, are the trays of hot and cold eggs sandwiched in the machine?

A. They are. Instead of setting all of a certain age together, they sandwich them, intermingle them.

Q. And with that arrangement, do you get a transfer of heat from the hot to the cold eggs?

A. Yes, sir.

Q. Now, if you set all your eggs at one time in this Buckeye machine or in any machine, you would not have the transfer of heat from hot to cold eggs, would you?

A. No, sir.

[fol. 111] Q. Because all the eggs would be either all cold or all hot, is that right?

A. They would be all stages, so far as thermal heat is concerned.

Q. At any one time, all the eggs in the incubator would be in the one stage of incubation?

A. Yes, sir.

Q. And they would all be giving off heat, if it were along toward the last of the incubation, or they would all be cold at the first?

A. Yes, sir.

Q. And that is what you mean by staged incubation, is it?

A. Yes, sir.

(The operating book for Buckeye All-Electric Mammoth Incubators, 1931-1932 edition was offered and admitted in evidence and marked "Plaintiff's Exhibit No. 9.")

The witness resumed under direct examination by Mr. Ely:

I have some drawings here showing diagrammatically, more or less, a commercial Smith incubator. I will take that chart and explain to the Court the air circulation in the Commercial Smith Incubator. This is a sectional view through the Smith incubator. Much of the detail has been left out for the sake of clearance. You will note that it is a chamber which is divided into a central corridor and egg chambers on each side. At the top of the central corridor, there is a fan compartment in which the fan is located, and on each side of the corridor there are curtains extending to a point near the bottom of the corridor.

[fol. 112] The operation of the machine, so far as air circulation is concerned, is indicated by the arrows. The air is propelled downward from the corridor by the fan. Near the bottom it passess into the egg compartments on both sides, thence upward through these egg compartments, to a point near the ceiling, where it is drawn back again into the fan compartments. You will note on the side of some of these arrows I have figures which indicate the approximate speed of the air at those points, in lineal feet per minute. At the time these tests were taken, the fans were operating at from 1,600 to 1,650 revolutions per minute. The maximum speed that is delivered by a fan of this type

is approximately 1,200 lineal feet. I have one arrow there near the top which is labeled 1,140 feet.

Now, this fan area where the speed is high is only over the surface of the fan. The fan is 16 inches in diameter. Now, by the time that reaches midway in the corridor, this same volume is spread out so that the velocity is very greatly reduced. At the points where it passes underneath the curtain and into the egg compartments, the speed will vary from 200 to 300 feet per minute; thence it passes upward through the egg compartments, and there again you will note that the speed is greatly reduced because you have a much larger area through which it is moving.

The Court: Why does it vary and differ on different sides at the same relative points?

The Witness: You will find it varying at different times even at the same point. The control is not accurate enough [fol. 113] to make it move with the same speed; and furthermore, air moving through channels such as this does not follow the same speed all the time. It becomes turbulent and moves faster at one point than another, and where it returns back into the fan compartment above the speed area is increased again to approximately 500 feet per minute.

The witness resumed under direct examination by Mr. Ely:

The average speed of the air through the egg trays is approximately 75 feet per minute. You will find points, where the air is moving faster than at other points. There are some points where the air actually reverses, eddies back. You will find these eddies practically always just inside the bottom of the curtain, where the air is passing underneath the curtain, immediately above that it is eddying back, and air passing any obstacle is inclined to form eddies around the side of it; and we also find quite a number of eddies in the corridor. As a matter of *fact*, it is full of eddies. Air is a fluid, of course. It is comparable in its movement to the movement of water. All fluids follow certain lines in movement, and we can see water in motion. We cannot see air in motion very well, but a study of the two shows that, in moving, they follow the same laws. There is a difference, of course, because of the viscosity of the two fluids, but water, if it passes an obstacle, we know

it forms certain eddies there. If it is moving through a broad open chanel, it may move smooth and regular, [fol. 114] but the minute it comes to a shallow place, or the channel through which it is moving changes, it changes the nature of its flow. That is, it may be a turbulent current or it may be a linear current. That is, taking it for analogy, say the water in the Niagara River that is flowing in a current toward Niagara Falls. Where the head of the stream is suitable, we will find the current moving in a linear form. It may move faster in the center than it does at the side, or faster in the center on top than it does at the bottom, but nevertheless, different parts are moving along in parallel lines, or substantially so, and we refer to that as a linear current; but if it comes to a place where the channel changes, it may find it becoming very turbulent. It is moving in a current, however, even though it is turbulent.

Turbulence is a characteristic of current movements of fluids. It is a characteristic of all fluids in their movements; that is, after they pass a certain critical velocity point, all fluids become turbulent.

By turbulence, I mean that the different particles of the fluid move forward in irregular sinuous paths. The water or air, when moving in a stream, moves at different speeds at points, even though it may be in a smooth channel.

Even if the bed is perfect, you would expect it to move faster at the center than you do at the sides, or faster on the top than you do on the bottom. It depends on the friction of the particles it comes in contact with. There is no substantial difference in that characteristic of water or air; they both follow the same rule or law. I measured the [fol. 115] speed of these air currents,—these measurements were made with an anemometer. As to how many tests I made in this machine to determine the character and speed of these currents, I expect, thousands. And this has been the result of a check by me of actual current movement in the Smith machine. The maximum air speed is found, directly under the fan, up right at the delivery point of the fan. As to the condition as to the air speed from that point on, the fan delivers a cone charge; that is, the charge spreads as it goes down, and the more the charge spreads, of course, the slower it becomes. The air current has its lowest motion where you have the most area or cross-sec-

tion area to the current. For example, in the egg chambers, the total cross-section area of the two egg chambers in the Smith 52,000 egg machine is 75 to 80 square feet. In the fans, where it is moving the fastest, those fans are only 16 inches in diameter, and there are four of them in the machine, so that the cross-section area there would be four times the 16-inch fan. I have forgotten just exactly what that is, but you have it moving at a rate of less than 1,200 feet per minute there, and by the time you spread that out over 75 square feet cross-section, you greatly reduce the velocity, and it amounts to less than 80 feet per minute that is possible, on the average. Now, as the air passes up through the egg trays, it passes up through the trays or the egg columns to near the top of the incubator, where it passes over the beam, that is shown, that forms each side of the fan chamber. It is going back into the fan chamber at the speed of approximately 500 feet per minute. Now, as the air goes through the egg trays, it naturally follows [fol. 116] the paths of least resistance, but if you will look at the third sheet shown here, which is marked "SS", that is taken in the plane SS as shown on the first one, which would be almost through the center of the egg column, you will note there the trays are represented by the rectangles that are placed in regular manner there. They represent trays, 12 trays high, and between these columns of trays you will note that there are air columns that are formed when the trays are tilted. Most of the air passes up through those air columns. That is the point of least resistance, and, of course, that is where they go. In this drawing, this Fig. 2 represents the side elevation of the corridor with the curtain. It is labeled here "RR", which represents the section through the center of the corridor. That curtain I have shown is shorter than the curtain shown in the patent. This is a correct representation of the Smith incubator as it is made in commercial practice.

As to the reason for shortening the curtain, and when that was done, I can't give you the exact time when it was done, but I have never seen a Smith incubator that had a curtain very much longer than that, in actual operation. We tried it both ways, and it makes very little, if any, difference, and this is our preferred method of using it. Now, with the curtain shortened as you see, there is considerable space above what is known as the hatching tray.

The speed of the air underneath the hatching trays is indicated by the figures on the side of the circle. The circle represents the position of anemometer at the time the readings were taken. The minus sign in the center of this circle indicates that the air is going away from the observer, is [fol. 117] going out from the corridor and into the egg compartment and the numbers on there represent the speed as recorded by those anemometers.

Now, the same is true of the circles that rest on top of the hatching racks, and you will not there the speed is not quite as great, being from 190 to 250 feet per minute.

Now, in actual operation, about one-third of the air comes down the corridor passes underneath these hatching trays, and about two-thirds of it passes between the curtain and the top of the hatching tray. About two-thirds of the air in one circuit, then, will not reach the hatching trays.

Asked as to the foul air outlets and the fresh air intakes, the witness said: In the commercial Smiths that are being placed on the market today, we have, above each fan, a five-inch opening, and above each egg compartment, we have four four-inch openings. I am referring now to the Model 52 size. Now, that would represent the maximum size of those holes. Now, we restrict the intake openings so that only a small percentage of their actual capacity is passing through under normal conditions. We have the larger capacity to take care of extreme weather conditions that we sometimes have in Southern California or in Arizona; and we also restrict the outlets with a valve which will prevent a back-draft in there.

Counsel for the plaintiff then offered in evidence the book containing defendants' catalogs and books of instruction referred to by the witness and the same was admitted in evidence and marked Plaintiff's Exhibit No. 10.

[fol. 118] Counsel for the plaintiff next offered in evidence the drawings of the Smith incubator referred to by the witness, being three sheets of drawings, being a sectional view across the machine through the fan; a diagramatic sectional view along the corridor; and a sectional view in plane parallel to corridor and midway between the front and rear of trays and the same were admitted in evidence and marked respectively Plaintiff's Exhibits 11-A, 11-B and 11-C.

The witness then resumed under direct examination by Mr. Ely:

Taking my copy of the patent in suit just a moment—there is a statement in the patent about the stage of incubation at which the eggs are the most difficult to keep down in temperature. At the bottom of the first column on page two, starting in with line 61 on page two, it says, "so as to compel the air to circulate through the mesh bottom and around and about each egg as heretofore referred to, and as the eggs further advanced in incubation are contained in these lower trays and as the danger is that the temperature will rise in these eggs to a point injurious to incubation the improved method disclosed herein permits the circulating air to act as a medium to prevent the over heating at this stage of incubation."

As described in the preferred apparatus here, the eggs are in the 15, 16, 17, 18 day stage. And that is the stage referred to as the "stage further advanced in incubation". [fol. 119] That is referred to specifically at line 65 on page two. And those are the eggs in which the patent says that the temperature must be kept down particularly. And that is not the hatching eggs he is talking about—not those where the chicks are actually emerging from the shell.

As the fan operates, it throws air out on one side and it pulls it in on another. The quantities of air are equal in both cases. That is, the air that is being pulled into the fan is equal to the quantity of air that is leaving the fan, and it has come to refer to the air that is being drawn into the fan as an induced draft or induced current.

There is a similarity there between the operation, say, of a pump, pumping water. At a pumping station, if you are pumping water, there is a current of water flowing towards the pump. There is also a current of water flowing away from the pump, and the volumes are the same in each case, and it depends on the size of the conduit as to whether the velocities are the same. As a general rule, the current flowing into the pump is less disturbed than the one that is going out from the pump, but nevertheless they are both currents of equal velocity if the pipes are of the same size.

There is more turbulence in the current after it goes through the pumping means, whether it be a fan or whether it be a pump. And an induced current tends to be smoother, depending upon the channel through which both currents

are passing, but if the channel is the same in both cases, the current immediately leaving the fan, for example, is much more turbulent than the one that is flowing into the fan on the opposite side.

[fol. 120] I am asked if there is any advantage in having the eggs subjected to an induced current rather than the one delivered by the fan? That which is delivered by the fan is not uniform over the entire area. That is, it may be at variance at different points, but an induced current is much more uniform; it flows more uniformly throughout the entire area.

Whenever a fan of any description is moving air in closed cycles, or substantially in closed cycles directly in front of the fan, there is no question but what the current is forced. On the opposite side, the current is pulled. Now, if that air is traveling in a cycle, it is always a question as to just how far the forcing carries it and how far the pulling carries it. It makes no difference, so far as completing the cycles is concerned, whether the current is being pulled or being pushed.

Taking this drawing of the Smith incubator, Exhibit No. 11-A, it would be hard to point out the exact place where the induced current begins and the forced current is left off, but the general region of the egg trays is an induced area, or it might be almost a neutral area, as to whether it was induced or forced.

The pulling action of the fan draws the air from the top of the egg chambers, and it is an induced current. It is certainly an induced current in the top of the egg chambers, but whether you would carry that to the bottom tray or not, I am not in a position to say.

Now when the air enters, when the fresh air, this increment of fresh air, enters into the cycle, it enters back of the fan in the induced current. The fan thoroughly mixes and [fol. 121] agitates it so that the cooler air is thoroughly diffused through the mass of air that is already there. And then the cool air, or the increment of fresh air, goes and enters into the recycle from that point on.

The maximum speed with the type of fans that we have showed here is 1,200 feet per minute. As to the amount of air each fan is delivering, the manufacturers of those fans rate them at 1,500 cu. ft. per minute, running in free air;

that is, without any resistance, 1,500 cu. ft. Whenever you put resistance in its way, of course, it slows that up to a greater or less degree. And as the air spreads out through the corridor, and then the egg chambers, the speed of the air decreases.

I am asked if there is, as a matter of fact, any point in the Smith machine where the air reaches any such velocity as 11,000 feet a minute. There certainly is not. The highest velocity that we have is about one-tenth of that. 11,000 feet per minute is considerably over two miles a minute, which would be around 125 or 130 miles an hour. As to what would happen to the eggs in the trays if any such blast of air blew through those eggs—well, we would have a good sized omelet, anyway.

Tornado speed, the highest speed that is given in storms, I believe, is 100 miles an hour. The highest speed that we ever experience in this section of the country is perhaps 70 to 80 miles an hour. Then with a speed of 11,000 feet per minute you would undoubtedly blow that machine all to pieces and blow the building down.

Now I also have some drawings which show the commercial Buckeye machine.

I am familiar with the decision of Judge Westenhaver; I have read the decision and he does not say that air tra- [fol. 122] velled 11,000 feet a minute. He does not say that at all.

Now, taking this drawing—it is a cross section of Buckeye Incubator No. 48. It is drawn to scale. This incubator holds approximately 5,000 eggs. You will note that there is a central corridor having a fan about midway between the floor and the ceiling. In this machine there is no corridor that a man enters or works in. There are doors on each side of the incubator, which open outward, and all the work that the man has to do with the machine is done from the outside. You will note that there are trays arranged at different levels, and they contain eggs in different stages of incubation. In this machine, the Buckeye Company does not recommend that the eggs be placed in one position for a period, and then in another position for another. They put them in these upper turning racks and leave them there for 18 days, and then at the end of that period, they remove them from there and place them in the hatching tray at the bottom. That is a tray where the

eggs can be left level and allowed to remain there during actual emergence from the shell.

The partitions on each side of the fan chamber are wood in this case, and there are no curtains; and you will note that the fan is forcing the air downward in the chamber when there is a passage-way into the egg chambers on each side of the central corridor at the bottom; then the air passes upward through and about the trays, and then is drawn back in at the top of the incubator, at the top of the egg compartment or at the top of the fan compartment [fol. 123] again. This is a small machine and you work it from the outside through the doors.

That machine is manufactured under the patent. And it is a commercial machine.

(Counsel for the plaintiff then offered in evidence drawing of the Buckeye Incubator No. 48 identified by the witness and the same was admitted and marked Plaintiff's Exhibit 12.)

The witness then resumed as follows:

Now, I have here the showing of the first Buckeye machine that was put on the market under this patent, way back in 1917. The size of that machine was 2,440 eggs. Relatively speaking, the machine was approximately four feet high, five feet long, three and one-half feet deep. At that time they advertised both the old type that they had made heretofore, and also this new type. This was the first machine that came on the market.

The first machine that came on the market under the patent. The catalog has been used several times and is not in such good condition. The front page gives a picture of that machine. I might say that this was published in 1917, copyrighted by Buckeye Incubator Company in 1917.

On Page 4 it gives you an idea of the general size and appearance of the machine by the man that is standing near it.

To get an idea of the general arrangement of the machine, we might turn to Page 6. The door is open there [fol. 124] in the center which shows a central compartment with heating pipes. There are fans immediately above that part. There are two fans shown there, as you see the top of them; on Page 4, you notice the operator

has pulled one of the fans up so that you can see the size of it. These were a small fan.

Then, further over, on Page 8, we have a phantom view of this machine. There are egg compartments on each side of a central corridor, the fans at the top, heating coils at the side, and the arrows there indicate the air movement in the machine.

The fresh air intakes were immediately above the fan. As a matter of fact, they were located in the board that was directly above the fan, so that when he lifted the fan out, the holes were located in that board. The exhausts were directly over the egg compartments.

This incubator embodies the Smith process in its operation. It does not have any "man entering corridor", that our friends have talked about.

Counsel for the plaintiff then offered in evidence photostatic copy of the Buckeye Catalog copyrighted in 1917 and the same was admitted and marked Plaintiff's Exhibit No. 13.

The witness then resumed as follows:

I am familiar with the James Way Incubator Hatcher that has been put on the market recently by the defendant in this case.

[fol. 125] I became familiar with it first, through advertisements, and then I had occasion to see them in use, and then the Smith incubator purchased a unit that we have had in our possession for three or four years, and I have used that in regular hatching operations, in preparation for this case. I carried on actual hatching operations in that machine.

I visited the plant of the Elmira Hatcheries in Elmira, New York. I think it was in April, 1930. I found three different incubators in operation there. They were operated as three separate machines. They were 10,000 egg capacity each. One of them was being operated as a gas-heated machine, if I remember correctly, one as an electric-heated and one as an oil-heated, I believe. The machines were substantially identical, with the exception of the heating equipment. And they were identical with the machines which are being put on the market by the James Way Manufacturing Company. And I saw those machines in operation in the Elmira Hatchery.

I cannot give the names right now, but I talked with two or three different people at the Elmira Hatchery. They explained to me how the incubator was run. I have also learned how the James Way incubator is run from an instruction book which they have issued. I have catalogs which show the James Way incubator which is here in suit. The catalogs which were furnished us by the defendant, Plaintiff's Exhibit 10.

If you will open about the middle, you will come to a place where they have the regular catalogs. Now, the first one of those of this type, that will be the one. This [fol. 126] is Book No. 68, and copyrighted in 1929. That is about the time they first came on the market with this machine, to the best of my knowledge.

Perhaps Page 7 will give us a better idea of the incubator. On Page 7 they show the incubator with the hatching compartments at the top. One door of the incubator compartment is open and two of the trays are partially drawn out at the bottom. Above this incubating compartment they have the two hatching compartments which are the old style incubators which they have utilized for the actual emerging of the chicks from the shell. There is nothing particularly new about these two upper compartments. They are the same as they were using before, up to this time. That is a still air type of machine.

Mr. Ely: And that part of the equipment is not in litigation here, your Honor. We are directing our suits to the incubator.

The witness résumed:

On the opposite page, Page 6, it gives you another view of the same equipment. You will note the four doors on the front which open onto the incubating compartments, and then the small sections at the top are nothing more than the old sectional incubators that hold 180 eggs apiece. The eggs are set in that incubator in accordance with that instruction. They are set in staged incubation. You will note that there are ten trays shown in the cabinet that [fol. 127] is open. Each tray holds 210 eggs. Now, they arrange their eggs in this machine at different levels, as they specifically instruct that two trays be set in each compartment, or in a compartment, every three and one-half days. The only definite arrangement regarding it is that

you follow a regular plan of setting; that is, you could set the top today, if you wanted, and three and one-half days later you could set the next two below, or you could sandwich them. You could arrange them in any manner that you wanted to, but the eggs are placed in this position and left there for 17½ to 18 days.

They have some reference in their instruction books to that point of how the eggs may be set; that is, they may be set in any way at all.

At the bottom of page 8, there is Paragraph 21 that are instructions on how to set the eggs. It reads: "Having planned the hatches to come off twice a week, and having arranged to set four trays in each unit at each setting, the operator may ask himself where to put these trays in the machine. It matters not, as far as results are concerned, but like any other business, a regular system should be established and followed for the purpose of convenience and efficiency. Some operators prefer to put the first setting of two trays in the top of the cabinet, and the next setting of two trays directly underneath, and so on until the machine is filled. Other operators prefer to stagger the trays, putting one tray on the top shelf, and the other tray on the third shelf. At the next setting, a tray is put on the second shelf and another on the fourth shelf. On the next setting a tray would be put on the fifth [fol. 128] shelf and one on the seventh, and so on until the machine is filled. Still other operators do not follow any definite plan, but place the trays wherever there may be empty spaces. It should be remembered, however, that there are four hatching compartments above each cabinet, and only four trays of eggs should be started in one unit at any one time."

That is to say, it does not make any difference in operation of this machine what order or ar-ment of eggs you have. You could get heat transfer from hot to cold eggs, just the same, as in this one. When this cabinet is full of eggs, some of the eggs are endothermic and some exothermic. And there are some of the eggs in this cabinet which are giving off heat and some eggs that are absorbing heat. And it does not make any difference, in accordance with the instruction of that book how those eggs are arranged.

The heat is transferred from the hot eggs, to the cold eggs in the James Way machine by circulating the air with

sufficient rapidity over and about the eggs, the mass of air, units of heat will be picked up from some eggs and heat will be given up to other eggs, and the entire mass of air is then mixed together and made uniform, and heat units are transferred by the mass of air rather than by a particular unit of air successively contacting eggs in different stages. For example, in carrying out this process, it is not possible for a given unit of air to pass or to contact all the eggs in a given column, due to the manner in which they are moving. It is only conceivable that a given unit of [fol. 129] air will contact two or three eggs, while it would be impossible for it to contact successively eggs in different stages of incubation, but the air is itself circulated around and about all the eggs. The mass of air will pick up heat units from some and give up heat units to others, and then, because the mass of air is being circulated around all the eggs, and with sufficient velocity, the uniform temperature will be maintained throughout the entire mass.

Comparing that method of maintaining uniform temperature throughout the mass, with the method of maintaining uniform temperature throughout the mass of eggs in the Smith, it is identical. In Smith and in the James Way, the air functions in the same way. It would be impossible for a given unit of air — successively contact each egg or an egg in each stage of incubation, in a given cycle, and heat is not transferred by a given unit of air picking up heat from one egg and then carrying it to another egg, but it is transferred by the entire mass working and mixing together.

Now, in that James Way incubator, when you get it full of eggs you have eggs which are further advanced in incubation as described on line 65, Page 2, of the Smith Patent. And you also have the cold eggs which are at some other point in that circuit.

Now, the instrumentality that carries out the circulation of air in the James Way incubator—there is a power-driven fan in the top of the cabinet. Referring to the catalogs, on pages 24 and 25 of the catalog, the upper cut is a top view of this incubator with a portion of the top removed and a portion of it cut away. The point that is [fol. 130] numbered 7 here is called the impeller, or the impeller part of the fan, and that is located in the top of the machine, above, at a higher level than either of the egg compartments. That is caused to rotate at a speed of

800 or 850 r.p.m. by a motor which stands on top of the incubator, which is shown in the right-hand lower figure. The motor is on top. It is connected by a shaft with this fan in the top of the incubator. That fan runs, as I have stated, at a rate of 800 or better revolutions per minute. It is a centrifugal or blower-type fan. It is housed in above and below by metal, so that it is a true fan in its action, blowing the air out centrifugally. It is blown to the front, where it enters the ducts 13, at the front and back of the upper diagram, and in those ducts, the air is carried downward to a point at the bottom of the cabinet. It is not quite as easy to see—

I had better get my drawings. I have made drawings of the James Way incubator. Those drawings are to scale. The machine depicted in those drawings is the machine with which I made my tests, and so forth, that I am going to testify to. And that is the machine which is now down in the warehouse here on Ellicott Street, that we want the Court to see. That is also the machine that was here at the time of the proceedings on the preliminary injunction.

Counsel for the plaintiff then offered in evidence a drawing of a vertical cross-section of the James Way incubator and a drawing of a vertical longitudinal section of a James Way incubator which were admitted in evidence subject to examination by counsel for the defendant and marked [fol. 131] Plaintiff's Exhibits Nos. 14 and 15 respectively.

The witness then resumed as follows:

We will first refer to the vertical cross section. (Exhibit 14.) This is a drawing showing a cross section of the James Way incubator unit with the front of the machine to the left; the door is represented at the left. At the top of the machine we have placed the motor directly above the fan. At each side, directly in front of the fan, we have indicated a moisture pan in its regular position, and to the sides of the fan we have two heating pipes, one on each side.

Now, directly above this fan you will note that there is a housing which gives the fan barely operating clearance. There is also a corresponding housing directly below the fan which, again, barely gives it operating clearance. In this housing there is an opening above the eye of the fan so that the air can circulate into the eye of the fan, or, in

other words, the fan can feed. In the lower housing there is also a corresponding opening so that, as this fan rotates, air can feed into the center of it from both sides, and then the paddle wheel arrangement forces the air outward because the housing controls it and makes it go outward by the centrifugal action.

Now, directly below this fan compartment we have the egg compartment.

By the Court:

Q. The fan compartment, how far does that extend on either side? You spoke about the pan, the moisture pan.

A. The moisture pan is inside of the fan compartment.

[fol. 132] Q. How far do the wings of the fan extend?

A. That has a radius of about eight inches, and it is, say three and one-half inches high, and the housing comes close to it on each side.

Mr. Ely: The fan is colored brown, your Honor.

Q. What is that above, that purple line across there?

A. That simply represents——

Q. Above your finger to your right?

A. That is an electric heating element. It is a ring heating element.

Q. How does the width of the fan compare with the width of that heating element that is shown there?

A. The heating element is a ring about eight inches in diameter, perhaps, the ring part. It has an inside diameter of perhaps six and one-half inches. It is just a circular ring that fits in the air stream where the air is passing through it.

By Mr. Ely:

Q. I thought I understood you to say that the fan was eight inches in diameter?

A. Radius.

Q. Oh, a radius of eight inches?

The Court: I do not gather from this how wide the fan itself is.

Mr. Ely: Well, here is the fan, your Honor, or a reproduction of it right here.

The Court: Yes, I know that. It is shown here as about where those arrows come down on either side, apparently. All right.

[fol. 133] The witness then resumed under direct examination by Mr. Ely:

The fan chamber is colored a pink; that is the air space through it. The fan feeds near the eye or the center of it and discharges the air, which it takes in at the center, from the tips of the blades. It discharges it centrifugally, into what I have called the fan chamber or beyond the casing. The lines of that casing are indicated in black above and below the fan. They are labeled "fan housing". That is, there is a narrow channel or box in there in which that fan rotates. And the fan feeds from the center and discharges to the outside of the box. It is a centrifugal fan. And it discharges air over those heating pipes, and then the air goes into the channels that are shown on both the left and right hand side, where the arrows are running down through the ducts to the bottom of the incubator, or to a point near the bottom where it is an opening into the egg compartment. That is a corridor for the passage of the air. And it is divided into two corridors. There is one at the front of the machine and one at the rear of the machine. This passage-way or corridor in the front of the machine is located within the door. That is, the door is a hollow door. And when it closes, that makes the channel communication with the passage for the air from the fan. The other channel or corridor is in the back of the machine. The sides are tight, making it a solid corridor to within approximately three inches of the bottom of the incubator.

[fol. 134] I have measured the speed of the air as it goes down from those passage ways. It is approximately 700 feet per minute. It varies a little at different points, but it is approximately 700. It would be the same average speed at the bottom of the corridor as it is entering at the top of the corridor. That is, it must be, because the corridor is the same area all the way down. It is a straight duct and the same size from top to bottom.

As to what happens to the air after it leaves those corridors down at the bottom, those passage ways down at the bottom, the air is traveling at an approximate rate of 700 feet per minute, and making the turn that it makes there, the natural tendency for it is to carry out towards the

center of the machine or towards the center of the egg chamber. Coming in from both sides, it carries towards the center and upward through the egg chamber.

That is, its velocity makes it swing around and swing out; that is, it would tend to do that, that is the natural condition; and to carry that just a little farther, for the time being. The air then moves upward through the egg chamber to a point where it is drawn back into the eye of the fan again.

In the vertical cross-section, we can see how it can come into the fan below, but we have to look at the other cross-section, longitudinal section, to see how it gets into the fan—

Let us look at the longitudinal section, then, Exhibit 15. In the longitudinal section you will note that there are two egg compartments, side by side, through which the one fan circulates the air, the fan being located directly above the [fol. 135] partition which divides the two compartments. In noting the fan in this position, you will note that there is a channel from the extreme left and extreme right, where the air passes up above the fan housing and goes through a duct to the eye of the fan that is on the left hand egg compartment. The duct is on the extreme left, which carries up and over the top of the fan housing, and in the right hand compartment the duct is on the extreme right, where it carries over the top of the fan housing, over to the fan. Now, you will note that the air is moving upward through the egg compartments, and when it gets near the top of the egg compartments, it must either pass into the eye of the fan from below, or else go to the extreme left or right and pass up over the top of the fan compartment and come into the fan from above. The amount of air feeding into this from above and below is approximately the same.

As to how fast the air is going as it goes into the eye of the fan, it is hard to get a correct estimate of that, but it is somewhere around 900 or 1,000 feet per minute.

As to how fast is it going in the channel leading into the eye of the fan from the top, we have been able to estimate that speed at approximately 1,400 feet per minute.

In the comparison of that speed to that of the Smith, the fastest speed we have on the Smith at any point is about 1,200 feet per minute. I am asked, does this air move in continuous full cycles that I have been talking about with regard to the Smith machine; and if this movement is similar or dissimilar from the movement of air in the Smith

in that respect. It is very similar. As a matter of fact, it [fol. 136] is the same general principle. The air is forced outward. In this longitudinal section we do not have the ducts which carry it to the bottom, but is forced outward by the fan, centrifugally forced down from the ducts to the bottom of the incubator, when it enters the egg chambers and passes up through the egg chambers and is drawn up through the fan again.

Perhaps I can show that recycling of air better in Exhibit 14, the vertical cross section. Starting with the fan at a starting point at the top of the incubator, the air is thrown out centrifugally, traveling to both the left and right, or it would be to the front and rear of the incubator, thence down through the ducts of the corridors to the bottom of the incubator, where it enters the egg chamber and is drawn up through the egg chamber and back into the fan again.

Now, just before we go any further on that, I wish to just compare that air circulation, that recycling air circulation, with the air circulation in the Buckeye, shown in Plaintiff's Exhibit 12. In the Buckeye we have two egg chambers and one corridor. In the James Way we have one egg chamber and two corridors. If you were to divide the James Way machine through the center and move it over so as to place the two corridors together, then you would have the one corridor and two egg chambers. It is simply a matter of arrangement, as far as any difference is concerned.

That is, in both cases, the air, as it leaves the fan, passes down through the corridor into the egg chamber and then back through the egg chamber, back through the fan and is [fol. 137] recycled.

As to how that air is moved, in the James Way machine, through the egg chamber and what sort of air movement you find there and how I found it—in the egg chamber, the air movement is upward at practically every point. The lower part of the egg chamber the air movement is upward at practically every point. The lower part of the egg chamber the air naturally has an eddy; that is, if you have an air current shooting in through the channel here, and another one there, at a speed of 700 feet per minute, those two channels or those two currents would have a tendency to come over and meet in the center and pass on up, but there would be a rolling motion on each side or an eddy. Now,

that is the natural condition that you would expect. The air then moves on up and is drawn in at the top.

Now, at the bottom of the James Way, there is a device which is labeled here as an air mixer. In their catalogs, they sometimes call it air mixer, and sometimes call it turbulator. Directly below that there are four openings, only two of them shown here, and they are for the admission of fresh air. They are one-inch openings. If the turbulator or air mixer was not there, these incoming currents of air from the sides would not thoroughly mix this fresh air coming in, or cooler air, until it had carried up into the machine for maybe two or three trays, or perhaps six or eight inches high. This turbulator or air mixer is placed here at the bottom and runs at a speed of a little better than 200 revolutions per minute. Its action is a slight fan action. To make it an efficient fan, the only thing you would have to do is change the shape of the blades; but that is [fol. 138] sufficient to mix this cooler air with the air streams that come down from the two sides, and prevent the air or the cool spots being created here in the bottom of the chamber because of the fresh air entering at that point.

As to how the function of that so-called air mixer or turbulator compares with the function of the fan in the Smith, as a means for mixing the cool air with the current of fresh air—it has the same purpose as in all the forced draft machines. It is not only the custom, but it is almost a necessity that fresh air be taken in behind a fan of some description, so that it will be thoroughly mixed with the other air before it comes in contact with the eggs; otherwise you would have a cool spot at some point.

Asked how the air continues in its movement up through the egg trays, the witness said: It moves up through the egg trays as a very definite current or stream. Right at the bottom, it is not as uniform as it is farther up, because the air is shooting in from the two ducts at the front and rear. It has a tendency to swing to the center, and there is a tendency for a downward draft along the sides.

Now, this air mixer also has a tendency to break up that central current, where they come to the center; it has a tendency to break that up so it is not so pronounced, and the air is leveled out more uniformly in the bottom trays than it would be if it was not there, and then the air moves

upward between the trays to the top in a very uniform manner.

That movement is a very definite current. It is steady, moving in one direction all the time, moving at a uniform speed all the time. The average speed of the current move-
[fol. 139] ment of air going through there is about 135 feet per minute on the average. You will find it going 150 in some places, and 160 in others, and at 90 in others.

It is considerably faster than the current of air in the egg chambers of the Smith. The average movement in the Smith is perhaps 75 feet per minute. The average movement here is about 135 feet per minute.

You find in the Smith places where the air will move at faster speeds than others. And you will find that same condition here in the James Way.

As to which is the predominant instrumentality on the air; which is the thing which controls the movement of the air; the fan up above, or the fan below—or instead of the "fan below", let us call it the air mixer; which is the predominant force on the air—the fan above is quite forceful. It moves the air with considerable velocity, while the one at the bottom, due to its shape and construction, is not very efficient as a fan. It operates at 200 r. p. m. or thereabouts, and it is sufficient for the purpose of mixing the fresh air with the other air, but its effect is not felt above the bottom three trays.

Now, that fan down below, or that air mixer down below, is moving at only from 200 to 220 revolutions per minute, depending upon the current. And the fan up above is moving at from 800 to 850 revolutions per minute, depending upon the current. And the fan up above is enclosed in a housing which not only makes it efficient but the housing definitely directs the flow of the air.

I keep calling that thing up there a fan; I say this thing [fol. 140] at the top is a fan. Now, I am at variance with the defendant on the title for that thing. I remember Mr. Toulmin said, "Do not mislead the Court; there is no fan on there." Mr. Toulmin, Sr., said that. Then, Mr. Toulmin, Sr., said, "No, it is not a fan in operation."

Now, my authority for calling that a "fan" is—

Well, in the first place, its construction is the same as many of the commercial fans that are on the market. There are several illustrations in the text books and catalogs showing a fan of the same description; and furthermore, the

James Way catalogs, books of instructions, and so forth, call it a fan.

There are numerous cases in the James Way catalog where they call it a "fan", but if we will turn to the latest book of operating instructions, which is the last one, just in front of the catalog—it is right in the center of the book. Now, on the first page, which is a sort of general information, under D, it refers to the "fan", shaft and bearings. That is, referring to the same instrumentality that I have been talking about.

If I may, I will just check this book of instructions through first. Again on page 3, under 13, Par. 13, "Inspect fans occasionally and keep bolts in fan drawn up tightly with a lock washer in each end."

Again on page 12, Par. 32, where it tells you what to do if the power fails; in the last line, it says, "no fans" meaning no fans operating, as the incubator has been dead, no heat, or no fans working.

In 33, in the first line, immediately below, it refers to the "fan" shaft; and again on 13 in Par. 40, it tells what to do with noisy fan shafts.

[fol. 141] Now, earlier in the book, they have supplied us with a number of books of instructions, and there is one point in there, there is a blueprint. Now, the page opposite that blueprint is entitled, "Instructions for replacing the fan in the James Way incubator hatcher." At several points through those instructions it tells you how to take off the old fan, how to put on the new fan; and then, if you will just turn over to the next page, there is a cross-section, Fig. 14, and about the center of the page it shows a drawing of the device, and it is labeled, "891-A, fan".

I seem to be in agreement with the defendant that that is a fan. And whether it is a fan or not, it is a device for impelling the air, or forcing the air. And the fan on the Smith incubator is a device for forcing the air, so the function of the two is the same. One is a centrifugal fan and the other is a propeller fan. Just two different types of fans, that is the idea.

I might state that there are numerous pages scattered all through here where they have referred to this as a fan. In fact, that word "fan" is sprinkled all through those instruction books.

Now, I noticed in Dr. Green's affidavit filed here on the motion for preliminary injunction, it says, "This feeder is

rotated at low speed and it is not designed to create currents of air, nor is it capable of doing so." I think the doctor is greatly in error. It is one of the simplest forms of fans. In fact, it is one of the most primitive forms of fans. I said the air moves in current form through the eggs in James; that is correct. As this air moves in current form it passes by eggs in various stages. And it operates as a [fol. 142] means to pick up the heat from the eggs in the further advanced stage of incubation and transfer that heat to the eggs in the less advanced state of incubation. The air will pick up the heat from any eggs that are warmer than the air and will transfer or deliver up the heat to any eggs that are cooler than the air. I find reference to that fact in the books of instructions and catalogs of the James Way Manufacturing Company, Exhibit 10. There are numerous cases of that. In the first place, they have definitely stated that you should not fill the cabinet with eggs, all of one stage, their reason being that, after you pass the tenth or eleventh day, the heat will be so great that you cannot control it. I would like to refer to that.

The title is, "To all users of James Way incubator hatchers." There are several of those, and this one bears the numerals at the bottom of the page, 022630-1.

On page three of that book, you will note that the first full paragraph starts out, "Operating cabinets with only a few trays or eggs in it", and the last sentence in that paragraph is, "Do not leave the cabinet full of eggs of the same age as, after the tenth or twelfth day, enough animal heat will be created so that you cannot keep this cabinet down in temperature."

So if you follow those instructions, you will put eggs in, some that are younger than ten days and some that are over ten days. And you will avoid, then, the excessive heating at the end. You will avoid that if you have the incubator partially filled with eggs that are absorbing heat. And the other part with eggs that are giving off heat. They tend to [fol. 143] equalize each other and that makes it possible to operate. That is, the fresh eggs, the eggs that have just been put in, will cool off the air, which will otherwise be excessively heated by the eggs which are further along in incubation.

There is something about saving fuel by this scheme, in the description of the James Way incubator. By utilising the heat of the hot eggs, they save fuel. The catalogs so in-

dicate. In the first regular catalog—that would be Incubator Book No. 68, turning to page 23, the top of the page is entitled: "New Economy of Operation, or less labor, less fuel, lower cost per thousands eggs, fewer calls, all makes for greater economy", and taking the last two words of the first column, starting there, "The incubator hatcher saves approximately one-third the fuel usually consumed for equal capacity."

It says it saves one-third; that would mean it takes one-third less. It takes one-third less fuel when you are setting the eggs in staged incubation with this device. Nothing gives off heat except those old eggs that are in the further stages of incubation. In addition to the standard equipment, that is to say, they save fuel by using the heat of the older eggs.

Now, about the movement of the air operating as a means to keep that temperature even throughout the incubator, they have reference to that in the James Way catalog. I think Catalog 42, page 15, is the one I have in my note, the same book that we just read from, page 15. You were at page 23 before.

I had it marked 42 in my book, page 15. It is headed at [fol. 144] the top, "Tempered Ventilation", and this pages takes considerable pains to explain how the air moves through the machine and starting with the bottom two lines of the first column, it says, "The air rises uniformly between all the eggs in the entire incubation compartment, without the effect of a direct blast, but with a gentle upward movement. The rising air is drawn through the two openings at either side at the top, and again mixed in the impeller compartment and starts another complete circuit of the cabinet. The rate of air flow is rapid enough to prevent differences in temperature at different points."

I call your attention to the first part, which says, "The air rises uniformly between all the eggs in the entire incubation compartment." That is, it is not beating around and stirring around, and all that stuff that we have heard about.

As a matter of fact, it is moving faster, the current form is moving faster than in Smith. Is is more easy to find it as a current.

In the words of the Smith Patent, admittedly air is moving with sufficient velocity from the James Way circulating device to maintain the air throughout the chamber at sub-

stantially the same temperature. The last sentence in the paragraph that I just read states, "The rate of air flow is rapid enough to prevent differences in temperature at different points."

Reading from Page 2, line 73 of the Smith Patent: "It is obvious that the fans can be so arranged and can be operated at such speed as to cause the hot air to circulate fast enough to keep the temperature throughout the chamber between the limits of 100 and 105."

[fol. 145] As a matter of fact, the temperature that this James Way incubator operates at is about 100 and one-half. That is found in their instruction books, to operate the incubator at a temperature of 100 and one-half. The James Way incubator has a construction in which the fans are arranged and operated at such speed as to cause the hot air to circulate fast enough to keep the temperature throughout the chamber between the limits of 100 and 105, as explained in the Smith Patent.

And that temperature is maintained by picking up heat units from the hot eggs and carrying them to the cool eggs, and the cooling effect of the cool eggs on the temperature of the air.

Now, with regard to this conservation of moisture, the moisture is conserved in the James Way machine. The moisture is conserved in the Smith machine.

By restricting the amount of fresh air that enters the machine, you prevent the moisture laden air from escaping, only in limited quantities, and the more you restrict the amount of fresh air that comes in, the less moisture escapes and you are able to control your moisture and raise it to proper temperature, or the temperature for incubation.

Now, pointing out in my drawing, Exhibit 14, the restricted openings by which a limited amount of fresh air is taken into the incubator, and the restricted openings whereby a limited amount of foul air is exhausted—the fresh air is taken in at the bottom of the egg chamber directly underneath the air mixer. At that point there are four one-inch openings. Now, the exhaust air is exhausted [fol. 146] at the top of the incubator on the left-hand side. Three arrows there indicate air is coming out and spreading. At this point there are two one-inch openings, or approximately that, for each egg compartment, and they are controlled; there is a damper or slide by which the open-

ings can be covered, and if they are covered completely, unless there is some leakage at some other point, there is no air enters the cabinet. If they are open, there will be as much air entering at the bottom of the cabinet as there is exhausted at this point, barring possible leakage at other points.

The Court: What is the purpose of having the damper on there?

The Witness: At certain seasons of the year, your outside atmosphere contains more moisture than at other times. If you are taking in moist air, you can easily take in much more of it and still maintain your moisture. If you are taking in very dry air, it is natural to shut your dampers off a certain amount. Furthermore, if you have the cabinet only partially filled with eggs, it is desirable to keep the dampers partially closed, and it is reasonable to understand that the more fresh air that you take in, the more money you have to spend for heat; and particularly, with the electric equipment, it is desirable to restrict the amount of fresh air or hold it down to a minimum, and at the same time hold your moisture at the right place. The two, moisture and ventilation, are very closely related in all machines of this type.

The Court: Is there corresponding apparatus in the Smith machine?

[fol. 147] The Witness: Yes, sir. The restricting of the fresh air inlets pulls down the amount of air that can be taken into the machine continuously. That is, here they control the exhaust; we control the inlet.

Q. Is there any difference in the practical results, whether you control the exhaust or whether you control the inlet, Mr. Taggart?

A. It is a matter of convenience only.

The Court: How do you control the intake?

The Witness: By the damper.

Q. Will you show his Honor that again, in the Smith Patent, where that is and the description of it?

A. In Fig. 1, directly above the fan, there is Fig. 24; there are two boards or slides there that are partially closing that opening. Now, they are adjustable. It refers to it in the patent as a valve opening.

The witness resumed under direct examination by Mr. Ely as follows:

The amount of air interchanged in either the Jamesway or Smith is going to depend upon the position of the slides, or the control of the exhaust and intake. If the exhausts are wide open, you will have a change of air, or you will let out a volume equal to the volume of your cubical contents in approximately four minutes; and in the Smith machine, if you have the valves wide open, it will be approximately three to four minutes. In both cases, however, there is a range there of practically the same range of air interchange.

It is purely a matter of construction or matter of handling.

[fol. 148] I am asked if the James Way incubator is a fresh air machine in contrast to the Smith? I do not see how it could be so classified. You can take in as much fresh air in one machine as you can in the other. It is simply a question of the size of the intakes. I find in the James Way literature several references to the relation of the air exhaust, and air interchange and conservation of moisture, reference there to the fact that they conserve the moisture in the James Way machine. There are several references to it.

In the operating instruction book, which is the last one before the catalogs, on page 10—as a matter of fact, you can start on page 9 with Paragraph 22, where it says, "Cabinet ventilation", it tells you how to adjust your exhaust openings so as to maintain proper conditions. It tells you how to have them different in different rooms and in different seasons of the year; and the very bottom two lines of Paragraph 22 is headed with the word "warning" in capital letters. It reads, "The ventilation should also be controlled to quite some extent by the humidity of the cabinet as described in the next paragraph."

Paragraph 23 is headed, "Humidity or wet bulb reading." Now, that paragraph is divided up into four paragraphs. The last one—there are four or five—the last one is headed "humidity and ventilation are closely associated. Humidity can be increased in the cabinet, not only by opening the moisture pan cover, but also by partly closing the ventilation slide. If unable to bring humidity up to the correct wet bulb temperature by opening the moisture pan

cover, you may partially close the ventilation slides but do [fol. 149] not close them entirely, even though you have but a few trays in the cabinet."

I will not take the time to read the adjoining paragraphs, but they bear on the same subject. There have been moisture pans in incubators as far back as I know anything about them. And the Smith patent has means for adding moisture to the air. In addition to that, it has means for conserving moisture because it moves in this closed cycle. And as part of that, restriction of the vents conserves moisture, as well. It holds down the evaporation. And in the James Way, the moisture is conserved, in the same way as the Smith.

At this point Court was adjourned to 81 Ellicott Street, where the witness, Mr. Taggart, demonstrated the Smith, Buckeye and James machines in the presence of the Court and Counsel.

Proceedings were then adjourned to January 31, 1934, 10:00 A. M.

Proceedings January 31, 1934, 10 A. M.

Appearances: Same as before noted.

The hearing was resumed on January 31, 1934, at 10 A. M., with the same appearances as before.

The witness Joseph Inskip Taggart, being recalled as a witness on behalf of Plaintiff, testified as follows:

Direct examination resumed.

By Mr. Ely:

Yesterday afternoon, after recess, we went over to the [fol. 150] warehouse at 81 Ellicott Street and saw a number of demonstrations which I conducted for the benefit of the Court.

We first inspected a Smith 52,000 egg machine. In this machine we first explained the operations of it in a general way. We then demonstrated with smoke tests to show the general direction and air movement, and character of the air movement. We illustrated with anemometers that the air was moving, and showed the Court how we placed the anemometers in different positions to take readings. The

air in the Smith machine was moving downward through the corridor and decidedly turbulent. There were numerous eddies in the corridor, and it passed outward and near the floor of the corridor into the incubation chambers, thence upward to the egg chambers and back to the fan. We pointed out that there was a small amount of air exhausting from certain ports and, of course, a corresponding amount being taken in.

I demonstrated the recyclying of the air, we showed by smoke how the air, being carried up to the top of the egg compartments, was drawn back over the beams into the fan compartment. The incubator was empty, so far as eggs. There was only one tray that was filled with china eggs to illustrate how the eggs were placed therein. Otherwise, it was in an operating condition. The temperature was not quite up to operating temperature.

Comparing these tests, generally, with the results which are depicted on these drawings of the Smith incubator that were introduced yesterday.

(Exhibits 11-a, 11-b and 11-c.)

[fol. 151] The direction and character of the air movement was shown to correspond to what is illustrated in the drawings. The speeds were not demonstrated to be the same. We did not take any particular readings there due to the number of people that were in the corridor. Air currents were greatly disturbed, and furthermore, the speeds, velocities and so forth, shown on these drawings were taken with a machine in regular operation position, filled with eggs.

Now, after the demonstrations with the Smith machine, we next inspected a Buckeye incubator No. 48, which is manufactured and sold by the Buckeye Incubator Company under the license under which they pay a royalty to Dr. Smith. It is operated on the same method or process as the Smith incubator. There are two egg chambers with a central corridor, separated from each other by wooden partitions, with passageways above and below, into the egg chambers, and there is a fan there that would cause the air to circulate in the corridor, and thence into the egg compartments, up from the egg compartments and back into the fan compartment again. That particular model of Buckeye machine had the hatching trays below.

We then inspected a Buckeye incubator No. 310, which is manufactured and sold by the Buckeye Incubator Company, under the patent, and on which they pay royalties to Dr. Smith. That incubator differed from the first Buckeye machine in that there were no trays in there for the eggs actually hatching or the chicks actually coming out of the shell. It was constructed to hold the eggs for the first 18 or 19 days.

We then inspected an incubator that was purchased from [fol. 152] the James Manufacturing Company and is known as the James Way. This incubator was simply the incubating unit. The hatching sections or the hatching compartments had been removed from above for the purpose of illustrating, for the purpose of putting in a glass top on it so that you could see what was taking place inside the air circulating chamber or the fan chamber, and other glass partitions had been substituted for wood partitions so that you could see what was going on inside one of the compartments. After inspecting the equipment and explaining its use and operation, we introduced smoke into the machine at different places, showed that the air moved upward in the egg compartments and into the fan through both the lower and upper opening, from which it was forced outward by the fan and down through the passageways at the front and rear of the incubator to the bottom, where it entered the egg chamber again.

After demonstrations with the smoke, we then introduced anemometers at different places and showed that they ran with certain speeds, showing a definite upward movement of air at all points except in the second tray from the bottom. At that point we showed that there was either a cross-current or no current, but we did not carry our illustrations far enough to show which it was at that point. In the James Way incubator, the air was moving in a definite current propelled by a fan at the top of the machine, downward through the corridors and upward through the egg compartments, and was recirculated over and over again. The character of movement of air, specifically, in the egg [fol. 153] compartment was a definite upward current at all points above the second or third tray from the bottom. In those trays there were definite movements that followed the same general direction all the time. Those were in the nature eddy currents. We found eddy currents in the

Smith machine. In the Smith machine there were numerous eddy currents in the corridor; also eddy currents directly behind the curtains; and technically, there were eddy currents scattered at different points throughout the machine; whereever the current of air would contact an obstruction, that would cause it to turn. Any fluid that moves faster than what is known as the critical velocity is turbulent, and the critical velocity depends upon the viscosity of the fluid and upon the channel through which it is moving, and on its speed. Those things all have to be taken into consideration; but in a machine like an incubator, where we have the egg trays and other objects for it to come in contact with, the air current is bound to be turbulent in all parts of the machine, wherever there is any appreciable velocity. In these smoke tests, to generate the smoke, we placed dry ice in water of a temperature of approximately 100 degrees, and the carbon dioxide gas that was given off was conducted by means of a tube to the point where we wanted to release it. The reason for using that type of smoke was that, after it had served the purpose of illustrating the direction, it evaporated into the air and disappeared, and there was no odor to it, and it did not smoke up the interior. With many kinds of smoke, they do not disappear, and it soon becomes so foggy that you can no longer see what you are doing. Now, there was some [fol. 154] other demonstrating apparatus that I had over there. One of the devices, I took a regular fan as used by the Jamesway Company, and mounted it— It was a duplicate of a regular fan; and mounted it between an upper and lower housing that corresponded to the upper and lower housing in the Jamesway machine; made the feed openings into the fan the same size that they are in the Jamesway, and operated it with the same motor that we use on the Jamesway, to demonstrate that a fan of that kind did have a considerable force. That is, it would throw air, in no uncertain terms.

This was mounted in a duct, and the intake of this duct was throttled so as to create a static pressure in there that was approximately equivalent to that which was—that is, the fan would be working under approximately the same conditions that it was in the Jamesway machine. The purpose of it was not to be accurate to the last detail, but simply to demonstrate that the fan did have considerable

force. The other apparatus was what I called, I believe, a tunnel, or wind tunnel, which had celluloid sides. In one end of it I had mounted an ordinary house fan and had placed such resistance in the line that the fan was turning very slowly. The air feeding into the fan— I should state that the fan was set so that it blew the air out so that the current feeding the fan would be an induced current. That is, the current through the tunnel. The current passing through the tunnel was an induced current, and it was operating at a speed of approximately two hundred feet per minute. In this tunnel I placed two anemometers to illu- [fol. 155] strate that you can tell direction of air flow by the use of an anemometer. There are different ways of doing this, but the simplest way is to move the anemometer so that it completely stops. If it stops, we know that you are at right angles—the face of the anemometer is at right angles to the flow of the stream. In that way, we can tell direction; then, by placing the anemometer directly across the stream, we would have a reading showing the air velocity. This, of course, is subject to correction of calibration of the anemometer, and other correction of that nature. The purpose of it was not to be extremely accurate, but to show how we established our readings.

(Counsel for the Plaintiff then offered in evidence the Smith machine which was demonstrated at the hearing the day before; the Buckeye No. 48 machine which was also in the warehouse; the Buckeye machine No. 310; the James Way machine which was demonstrated and the Jamesway fan demonstration unit and the wind tunnel demonstration unit, all referred to by the witness and the same were admitted in evidence and marked Plaintiff's Exhibits Nos. 16, 17, 18, 19, 20 and 21, respectively.)

The witness then resumed under direct examination by Mr. Ely:

I said I made some changes in the Jamesway machine [fol. 156] from the condition in which I purchased it, and that was to put in some glass doors, front and rear, and a glass top. I also cut away portions from three or four of the trays. That was done at the last, after my tests were made. It was done to give a clearer view of the conditions inside the trays. Those changes did not make any difference in the operation of the machine. I checked it before

and afterwards, and any difference that might be made would simply be very minute, and relative only. The general principle is identical. I have some photographs, which show the Jamesway unit, in which the incubating unit is changed the way I showed it over there on the exhibit.

There are three photographs. One of them shows the front view of the Jamesway machine. That shows the complete unit with the hatching equipment on the top of it. And it is the equipment as we purchased it from the Jamesway people, with the exception that glass has been substituted in one of the doors. The second photograph shows a closer-up view of the door. That has the glass removed from it, or has the glass substituted for wood partitions; and the third photographs shows a rear view of the same. That is a rear view of the compartment, showing how glass is substituted for the wood partitions.

(Counsel for plaintiff then offered in evidence the photographs mentioned by the witness showing Jamesway machine with glass substituted in one of the doors, showing closer-up view of door with glass substituted for wood par- [fol. 157] titions, showing rear view of compartment, showing how glass is substituted for wood partitions which said photographs were admitted in evidence and marked Plaintiff's Exhibits 22-A; 22-B and 22-C, respectively.)

The witness then resumed under direct examination by Mr. Ely, as follows:

Preparatory to this trial I made some extensive measurements of air currents, and so forth, in the Jamesway machine. The purpose of my making these calculations or tests were to study the conditions of air movement in the machine so as to know just what was taking place there. I can tell you the air speed or approximate air speed from various points and directions. These demonstrations of mine were not intended to be accurate to the last foot because,—Well, in the first place, with different currents, different types of currents, and even individual motors, there are no two machines that will be exactly alike; and furthermore, there was no reason for being accurate to the last foot. They demonstrate what takes place there, and also that there is a very substantial current. If corrections were made for the readings for friction on the anemometer and other corrections of that kind, the cur-

rents would be stronger, for the most part, than are shown on my drawings. If there is any error as far as velocity is concerned, the error is on the minus side rather than on the plus side. Now, in determining these current velocities, and so forth, in the Jamesway machine, I used anemometers. I made hundreds of tests with my anemometers. [fol. 158] I have a photograph here that shows the way the anemometers were placed. That is simply an illustration. Your Honor understands that in the machine, in operation. the trays are always tilted to one side or the other. The operating instructions furnished by the James Company are very specific on that point, that the trays must be turned; otherwise the air will not circulate as it should; and you will also remember that I called your attention to the fact that when the trays were turned, there were definite air channels established from the bottom to the top of the egg compartment.

The anemometers were placed in the egg compartment, in the trays as shown in this photograph so that as much of the anemometer would be over the air column as it was possible for us to have, the anemometer being considerably narrower than the width of the air column; it was as much over the air column as we could get it.

The Court: Are not these in the trays here?

The Witness: Yes, sir, they are in the trays in the same manner in which——

The Court: Then they would not be over the channel or column?

The Witness: A portion of it would be, yes, sir.

Mr. Ely: About half of it projects over.

The Court: Oh, yes, I see.

The witness resumed under direct examination by Mr. Ely:

This arrangement was similar to the arrangement I made with the anemometers yesterday in those few tests I made [fol. 159] with the anemometers in the Jamesway machine, and the Jamesway machine was filled with china eggs at the time I made the demonstrations yesterday. I have reduced to a chart, or series of charts my findings in the Jamesway machine in normal operation.

(Counsel for the plaintiff then offered in evidence the photograph mentioned by the witness showing how anemo-

meters were placed in tests made by the witness, and the same was admitted and marked Plaintiff's Exhibit No. 23.)

The witness then resumed under direct examination by Mr. Ely, as follows:

Now, in this first series of charts that are bound together, ten sheets in all, the first sheet is a scale diagram of an egg tray of the James machine with the door at the left-hand side and the rear of the machine at the right-hand side. We are looking down from the top; the baskets or individual egg trays in which the eggs are tilted, are shown there, but for the sake of avoiding confusion, we have not shown any eggs in these trays. The tests were made with eggs in the trays. The trays were filled yesterday. The circles on the tray represent the position in which the anemometers were placed. The machine was full of eggs. Of course, 28 anemometers were not put in there at one time. Anemometers were placed in these different positions and readings taken and then the anemometers were moved. This top sheet represents the top tray in the ma- [fol. 160] chine. The anemometers were placed in there in horizontal position, in all of these readings that are shown here, and the numbers in the center of the circle represent the readings of the anemometers in those tests. You will note that the readings on the top page vary from 45, I believe is the lowest, up to 505 feet per minute.

Now, in taking these readings, the anemometer was placed in the tray. In the first place, the anemometers were set at zero. They were placed in the tray, the tray put in the machine, and the motor started, allowed to run two minutes, and then shut off. The tray was then removed from the machine and the anemometers read to show how much air had traveled through them in the past two minutes. That was then divided by two to get the reading per minute.

That was the method followed in making all of these readings, and each readings here has been checked at least three times to see that it was a true indication, and if there was any air at any time, or anything that would cause me to question it, I would check it oftener than three times. The air moving through this top tray was moving upwards at all these points. This is the upward reading. Of course, in the center of the tray, the air is curving over

to your outlets, and the real air movement might be even faster than is shown here. That is, the two outlets for the currents are at one side or the other of the chamber. These anemometers were within at least four inches of the top of the egg compartment. And the current turns and goes to those outlets. I have got 505 feet per minute there and 350 on the eggs. With relation to these outlets, [fol. 161] that is very close to the outlet, that goes into the bottom of the fan. That is, the current is sweeping into those outlets at that point. That is the reason why the current is higher at that point, that is comparable to the speed of the air in the Smith egg chamber where it is going over the beams into the fans. In other words, with relation to that point, it is the same as the point where the air is going over the beams in the Smith. And the air going over the beams in the Smith is going about 500 feet per minute. That is to say, taking equivalent points on the Smith machine and James machine, I find the air speed approximately the same. And down here at the lower edge of the sheet, where I have 220 and 140, that is near the outlet on the opposite side. The outlet there is not throttled to the same extent that it is immediately underneath the fan, and we do not have as high speeds at that point as we do at the corresponding point on the other side of the tray. This demonstrates that the air is moving in current form through this. As there was no downward movement at any point through here. It was all upward movement. The speed is lower in the center. That is because that point is removed. It is further removed from the outlets. Now, take the next tray down. That records the readings of the anemometers in these positions on the second tray from the top. The speed in the upper edge has decreased somewhat beyond what we had on the top tray, that is towards that center fan outlet. The reason for that is, you are getting further away from the throat of the outlet and your readings change. The aver- [fol. 162] age over the entire tray is 135 feet. The average on the top tray, which records here, is 142½ on the eighth tray from the bottom, that would be the third one down, that had an average of 135. Differences in speed at different points are ironed out as you get further away from the top. As you get further away from the outlets, it becomes more uniform through the entire tray.

By the Court:

Q. What was the fan speed of the machine?

A. Of this machine?

Q. This machine?

A. The speed of the propeller, that is, that we had in the Smith?

Q. Yes.

A. They were running yesterday—the one we tested was 1,630 R. P. M.

Q. This shows 836?

A. This is the speed of the fan in the top of the Jamesway machine. It is a different style fan.

Q. Well, I was wondering about the effect of the speed of the fan on the speed of the air in the chambers in the machine?

A. The fan speed in itself means nothing. It is the volume of air that it delivers. You can have fans running at a high rate of speed that do not deliver near as much air as slower moving fans of different type, different construction.

Q. Well, the amount of air delivered depended on the size, or depended upon the volume of air in the instrument and, of course, the size of the corridors through which it goes?

A. No. A fan is rated at a certain velocity or a certain volume. The type fans which we had in the Smith yesterday are rated at 1,500 cubic feet per minute. Now, there are other fans built which have a different pitch [fol. 163] blades but are the same size, which will throw fifty per cent. more air than that. There are other fans of the same size and the same general type, but with a different type of current. For example, here in the city you have a lot of twenty-five-cycle current. You have that same construction or the same blades, and put on twenty-five cycle current, and you do not get over 1,200 cubic feet of air delivered, or from the same fan. The type fan that is used in the Jamesway machine here is delivering from five to seven hundred cubic feet per minute. It is difficult to get an exact estimate on it. I am giving plenty of leeway, but the volume of the machine, the air volume in there and the amount of cubic feet delivery is going to determine the air speed through the points that it is traveling, and the air speed up through the egg chamber of the

James machine average 135 feet per minute or more, and these readings here confirm that; that is, the readings are taken over the entire area and the average is made.

The witness resumed under direct examination by Mr. Ely as follows:

Pursuing that point that his Honor brings up, as to the volume of air thrown by a certain fan in Smith, that fan, running free and as sold by the manufacturer, is rated at 1,500 cubic feet per minute. And the four of them would be running six thousand feet, running free. Of course, when you put in resistance in there, you cut down on the volume, but 6,000 feet per minute would be a maximum for those four fans. The cubical content of a Smith incubator that has these fans in it that I am talking about, if [fol. 164] you make allowance for your eggs and egg trays, it is approximately 750 cubic feet. That is, you have four fans throwing 6,000 cubic feet of air a minute, and that is operating in a housing of 750 cubic feet, approximately. The approximate volume of air that is thrown by the fan in the Jamesway is in excess of 500 cubic feet per minute, and the cubical content of the Jamesway incubator, both sizes, served by the fan, the entire cubical content served by that fan, making allowance for the eggs and the equipment in there, it is slightly less than thirty cubic feet of air space. Now, making the ratio—taking the ratios of cubical content in the Smith and the volume of air thrown in the Smith and the cubical content of the Jamesway, and the volume of air thrown by the fan in the Jamesway, in the Smith machine, if the fans are throwing six thousand cubic feet of air, and 750 cubic feet of air space, the fans will be working over that air—all the air will be passing through the fans in approximately nine seconds. Now, in the Jamesway machine, where you have 500 cubic feet of air delivery, or greater, and the cubic contents of the machine is approximately thirty cubic feet—the air will be worked over approximately fifteen times, fifteen or sixteen times a minute, which would mean about every four seconds, which would mean that the air is worked over practically twice as fast in the Jamesway machine as it is in the Smith machine. And the faster your air moves, the more pronounced currents you will get. That is, I find, as a matter of fact, these identifiable currents of air with

greater ease in the Jamesway machine than I do in the Smith.

As to this change in the speed having any bearing upon [fol. 165] the results as far as incubation is concerned—any bearing it would have, it would have a tendency to iron out any irregularities of temperature to a greater degree.

The Court: You mean, the more rapid the speed——

The Witness: The more rapid the speed, the more uniform the temperature will be throughout the——

The Court: What I am getting at here, on the question of infringement, is the question—you do not claim a question of similarity of action or movements or currents, but the question is the effect of different rapidity of movement; but you have answered that, I think—not what speed has to do with the question of infringement, but the difference in movement.

Q. Is it a difference in kind or difference in degree?

A. It is difference in degree.

The witness resumed under direct examination by Mr. Ely.

Whenever you have a mass of eggs in there heating, you must move the air through them to keep them sufficiently cooled down, or the temperature sufficiently uniform. If you increase the velocity, you present no new problems. You simply do the job a little bit better, if there is any difference.

By the Court:

Q. Well, your point is that, in the Jamesway machine, as well as in the Smith machine, the speed is retained at a sufficient velocity to maintain an evenness of temperature throughout the tray of eggs?

A. Yes.

[fol. 166] Q. You claim that the fact the velocity is higher does not affect the question of the proper temperature to retain the eggs at, or at which the eggs should be retained?

A. It does not affect it, no, sir.

Mr. Ely: That is to say, your Honor, our point on this is that exact speeds of air do not make any difference, the exactness of the speed. In other words, the Smith patent is not limited to a speed of air of certain velocity, a certain

velocity of air. You can get the same results and increase your velocity if you want to, but there is no point in whether the air is moving at 75 feet a minute, or 150 feet a minute, or, as in here, at 135 feet a minute.

I call your attention to the fact that the average on the first sheet was 142.5; on the second, 135.2; on the third, or the eighth tray from the bottom, it is 135.2; on the seventh tray from the bottom, 140; on the sixth tray from the bottom 136.4; on the fifth tray, 131.5; on the fourth, 132.1; on the third, 131; on the second, 134.1; and on the bottom tray, 139.4.

I would like to call your attention to the bottom tray, first; that is No. 1. You will note that there is a considerable variation there near the center. We have one that reads zero; we have another that reads minus thirty. In the lower left-hand corner, we have one that reads minus 205, and one immediately above it, minus ninety. This tray is in the area immediately above the air mixer, and the action of the air mixer is experienced in this tray, in that it causes eddies downward on trays at certain places, and a stronger upward draft on others. Also, its effect is shown in the second [fol. 167] tray, which is immediately above; and you will note there, there are several zeros, a few minuses; and also, in the third tray, the effect is still felt in that. The upward movement is very slight at some points. That is to say, you have, at those points, eddy currents. As to the proportion of the whole volume and those currents it is very small per-cent. of it. And no greater percentage, say, than you find in the Smith egg chambers. In this lowermost tray I have the speed of air coming in, say, in the lower right-hand corner, 420,295, and 410. Those points are located with respect to where the air is coming in—they are near the point of entrance, but it is also on the delivery side of the impeller—or not impeller, but the air mixer; so that the air mixer at the bottom has a tendency to pile up the air moving, that is, upward moving current at that particular point. It is a very definite current. It moves substantially the same today and tomorrow and all the time, at that given point. I have a minus up in the corner, 75. There is a downward draft at that point. The air is coming in from the outward channel at a rapid rate, at that point, and it has a tendency to carry it out there. The mixer is moving in the opposite

way, so that it has a tendency to pull down at that particular point, and the current carries out further and it whirls back. You will note in this Exhibit 14, the air comes out here with a considerable force, and if this air mixer is turning, as it is, it has a tendency to pull away at certain points and to pull up at others as it meets these other two currents, the currents coming down from the sides, and so there is an eddy at that point, and there are definite places where there are eddies in here. You find an equivalent eddy in the Smith machine. Where the eddy passes underneath the [fol. 168] curtains, there is an eddy back at that point. There is none shown in arrows here, but nevertheless, one exists. That is, in both machines, at the point where the air enters the egg chamber, from the channel, there is an eddy just at that point, in both machines. That does not affect the fact that the air is moving in current forms through the machine.

(Counsel for the plaintiff then offered in evidence the ten sheets of charts mentioned by the witness showing findings by Witness Taggart on Jamesway machine in normal operation some were admitted in evidence and marked Plaintiff's Exhibit No. 24, Sheets 1 to 10, inclusive.)

The witness then resumed under direct examination by Mr. Ely as follows:

The defendant in this case has had considerable discussion about the functions of this so-called air mixer down at the bottom of the egg chamber, and the fact that that mixer turbulates the current. Now, in order to demonstrate the effect of that turbulator, I disconnected the turbulator entirely and made this same series of tests without the tubulator or air mixer running, and I recorded those tests in the same manner, and I have a similar set of tests to show the readings under those conditions. Then, after that, I removed the fan at the top and ran the machine with just the turbulators or air mixers running, had them running in their normal way, but no fan in the top, and charted the effect in the same way. That is, my purpose in making these two comparative tests, one with the fan running, and the air mixer not running; and the other with the so-called [fol. 169] air mixer running and the fan not running was to determine which device or which instrument was the real impelling force and the controlling force in the machine,

and whether the air mixer had any appreciable effect upon the current movement of the air.

Referring to the first set of charts with the upper fan running and the so-called air mixer not running, the witness said: In the first place, I would like to call your attention to the fan speed, when the first set of charts were made, that I have just testified to, that is, the fan speed was 836 r. p. m. and the air mixer at the bottom was 205 r. p. m. Now, when the air mixers were discontinued so that they were not running, the fan speeded up a little bit, that is, the motor speeded up a little bit, so that the recording of the fan was 841 r. p. m. That was only five revolutions per minute difference. That difference might easily be made by difference in current from hour to hour in the town; and one of those tests was made one day, and the others were made a day or so later. The slight variation would not affect the thing to any appreciable extent. You will note that in the top tray, the average air movement or air speed upward was 138.9. With the fan running, but the air mixers not running; and the tray immediately below— A comparison shows that the speeds are substantially identical at all points. In taking these readings, I took the closest five feet and made no attempt to get closer than the five feet per minute. That is, it is either 100, 105 or 110, and the average in this case is approximately three and one-half feet per minute less, which could be an error due to [fol. 170] various changes. A speed of air movement of three feet per minute would not make a difference. In the sheet immediately below, which would be the ninth tray from the bottom, we have an average of 137 where, with both the fan and the air mixer running, the average was 135.3, and you can go through these feet, and you will find that the total average upwards is almost identical with the average that we had when both the fan and the air mixer were running. The average in that case was 135.75 and in this case 135.98.

Now, you will note that in the bottom tray there is a decided difference, particularly in the center of the tray. When the air mixer was not running, the air was not disturbed as it swept in from the corridors at the front and rear, and was much stronger near the center of the air chamber than it was when the air mixer was running. That broke up that strong current in the center, and the

upward current was more uniformly distributed by that air mixer.

Now, that is also illustrated in the second sheet from the bottom; but by the time you have gotten up to the third tray, you will find that the effect of the agitator or air mixer was of very little importance. That is to say, the air mixer—smooths out the currents in the lower tray. It operates really to smooth out the current and make it more uniform over the entire area. It does not increase the speed, that is, the average speed. It increases it at some points, and it decreases it at others. But it tends to smooth out the current. That is to say, as you come down to the air mixer down there, the current will tend to sweep in from the two channels and concentrate at the center. Now, when you have that mixer moving down there, it distributes it [fol. 171] over the area and allows it to come up in more uniformly through the bottom trays.

(Counsel for the plaintiff then offered in evidence its Series of tabulations of James way machine with fan running and air mixer not running, referred to by the witness and the same were admitted in evidence and marked Plaintiff's Exhibit number 25.)

The witness then resumed under direct examination by Mr. Ely as follows:

The effect and, really, the work which the air mixer would do, would be determined, by running the machine with the upper fan not running and the air mixer running by itself. When the air mixer was operated by itself, that is, when the fan was disconnected and the air mixer operated by itself, the speed of the air mixer was 208 r. p. m., and I found that in the top six trays there was no air movement. There was not sufficient air movement to make any impression on the anemometers at all. That is, the air was still in the top six trays. No air movement at all. So any effect whatever of that mixer would only reach up to the fourth tray. In the fourth tray from the bottom there are only four points at which the anemometers moved, and they were all downward current. Five feet per minute. Fifteen, twenty and fifteen. I might add that there is a big error in those, because an anemometer will not accurately show a speed of that velocity. As a matter of fact, an air movement or fifteen or twenty feet per minute is not de-

tectable. It is not suitable for that purpose of hatching [fol. 172] eggs. It is hardly detectable. You can hardly feel it. It simply shows that the anemometers did move and moved in that direction. And the third tray from the bottom, there was more movement, but with two or three exceptions, the movement was all down, and the second tray shows more movement still, but you will note that the downward movement is through the center of the tray for the most part. If there is any upward movement at all, it is at the outer parts or near the corners, and this is shown more pronouncedly on the bottom tray, in which we had substantial downward movements near the center of the tray, which shows a slight fan action with that air mixer as pulling it down to the center and throwing it out at the outer edges. The action of the air mixer as running here did have a tendency to push the air out and up these ducts at the front, and back, throwing off centrifugally at the ends of the blades, but there was no readings taken in those ducts to show what kind of speed there would be in there.

(Counsel for the plaintiff then offered in evidence the series of tabulations of Jamesway machine with air mixer running and fan not running, mentioned by the witness and the same were admitted in evidence and marked Plaintiff's Exhibit No. 26.)

The witness then resumed under direct examination of Mr. Ely as follows:

Now, taking the movement of air through the machine, as a mass, the fan at the top of the machine is decidedly a dominating influence and the air mixer has very little [fol. 173] effect upon the volume of air that is moving. It simply levels out the speed of the current through the bottom trays, and it also mixes, with that downward movement, the fresh air that is taken in at the bottom before it has an opportunity to contact any of the egg trays. I am showing the drawings that were put in evidence by the defendant in this case on the hearing on the preliminary injunction, and a similar drawing that was put in by me. Now, there is quite a space down between the lowermost egg tray in the defendant's drawing of the defendant's machine and the distance between the egg tray and the bottom of the machine as shown in mine. I am asked what is the explanation of that. The drawing that I prepared

was a drawing made of the particular machine that we purchased from the Jamesway people. Since that machine was purchased they have seen fit to build their cabinets higher so that they will hold twelve trays high instead of ten trays high, and although it does not show it here, there is space for two additional trays, and at certain times each week, that space is filled with trays. They said that, on placing new eggs in the machine, they should be placed in this position until they have time to clean up their hatch in the hatching compartment, so as to take seventeen and one-half and eighteen day eggs out and transfer them, so as to make space up here so that, on two days each week, there are twelve trays in the machine. Now, with the ten trays as shown in the defendant's drawings, the lowermost tray is further removed by two trays from the zone in that air mixer than it is as shown in my drawings. And any [fol. 174] effect that this air mixer has is confined in this machine, such as I have shown in my drawings, to the bottom two or three trays. And up to the third tray, in the machine as I have illustrated it here, the effect is for the air mixers to level out the current and distribute it more uniformly. That is to say, in this machine, as shown in the Defendants' drawing, the effect of the air mixer, is dissipated practically by the time it reaches the lowermost tray. And that twelve tray construction is shown in some of the catalogs of the Jamesway Company. It is shown in their later catalogs. Now, in the operation of the Jamesway machine there is nothing which requires the operator to take eggs out at the seventeen and one-half day period. There is nothing which requires him to take them out until the chicks actually begin to move from the shell. There is no provision made in here for holding the chicks when they begin to come out of the shells, so that they have to be taken out before that time. The eggs can remain in the Jamesway incubator without affecting the operation at all up until the nineteenth day. And the instructions state that you can hold them there until you have had a chance to clean up your hatch and clean up your incubator, and if your hatch happened to be slow, and you had your work arranged properly, you would expect not to make the change until on the 18th, maybe the 19th day. That is in Exhibit 10. It would be the third one of these large catalogs. 79, is the number? Yes, sir, 79, on page 24. On the

bottom of the page it shows the incubating compartment with the front doors removed. In the lefthand chamber, the [fol. 175] trays are entirely out, and in the right hand, it is filled with trays. There are twelve trays high in this machine. Then, in the book of operating instructions—that is, the last book of operating instructions, just before the catalogs—on the top of page 9, beginning with the second paragraph, in the 12-tray Jamesway incubator cabinet, the lower two tray shelves, are used only to put in trays on hatching day to start the eggs warming up while the hatch is being taken off. This keeps the hatching program on schedule without the necessity of employing extra labor to take off the hatch before setting the next eggs. As to how long the trays will stay in and operate that way, that would depend entirely on the operator. There is nothing to compel him to take them out until the 19th day, and in operation, you would not expect to take them out before the 18th day, as a hatch does not clean up exactly in 21 days. With some breeds or some flocks, you expect to take 21½ days before you take your hatch off, and then, by the time yon clean up your trays—and you are always busy at that time, getting rid of your chicks, moving them out—and wherever there are such conditions, it is customary for an operator to get that out of the way before he transfers his eggs.

I was in court and I participated in the trial of a number of cases that preceded this case. I have some diagrammatic views showing egg arrangement and current movement of air in various machines that were held to be an infringement. I have a chart that I have labeled "egg arrangement chart". In this we show the arrangement of the eggs in different types of incubators, Smith and [fol. 176] Buckeye and Jamesway, and three other machines which have been held to be an infringement of the Smith arrangement. In the upper left-hand corner, we have labeled this "Smith arrangement at the end of the hatch." You will note there, there are fourteen eggs high. The eggs that are colored blue are endothermic eggs, or eggs in the endothermic condition. Those that are colored red are in the exothermic stage. Some of them you will note labeled the eleventh day, and just partially colored red, and that is to indicate that they are just passing through the neutral zone.

Now, you will note at the bottom, I have twenty-second day. Those are eggs in the twenty-second day, or they are

chicks that have already hatched out. Twenty-one days is given as the period of hatching, but in operation, it is quite customary at the present time to not clean up the hatch until it is about 21½ days, so that you are in the 22nd day period.

Now, the line running from the fan at the top and around and through the eggs, the flow of the air cycle in the Smith machine, that is down from the fan towards the bottom of the machine, and up through the eggs in different stages of incubation.

Now, the second chart, or the second block shows the Smith arrangement one day later. At that time you will note that, in the bottom position, there are eggs in their nineteenth day of incubation. At this period there are no chicks emerging from the shell in the incubator. They are all eggs, and there are no chicks there coming out. You will note that the air movement is the same, and we have explained in detail how the air moves through there [fol. 177] and transfers the heat from the warm to the cold eggs; and if you will remember, we explained yesterday that a single particle of air does not contact all eggs in all stages of incubation in any one cycle. A given particle of air will only contact one or two or three eggs at the most, but some particles will contact and pick up heat, some will give up heat, and then they are thoroughly mixed together again and continue on their cycles.

Now, in the third block, we have labeled it "arrangement of the Boling-Jensma incubator". In this case, the egg arrangement is substantially the same in that the endothermic eggs are at the top and the exothermic eggs are at the bottom, but they only made one setting a week, so you see it is the first day, the eighth day, the fifteenth day and the twenty-second day.

Now, the difference in the air movement in this from the Smith was that the current was reversed. The fan forced the air upward to the top of the machine and thence downward through the eggs, towards the bottom of the machine, and back to the fan again, completing the cycle in that manner.

Now, the next block shows the Boling-Jensma machine one day later, in which there are no chicks emerging from the shell, and there will not be any emerging from the shell for four to five days later.

The Court: Do you claim it makes any difference whether the air went to the bottom or top?

The Witness: Yes, sir. The Court in this case, which [fol. 178] was before Judge Cavanah—the case was heard by Judge Cavanah in Idaho, and he held that this arrangement and this air movement was an infringement of the Smith patent.

Asked how this heat is carried from the exothermic to the endothermic eggs, the witness said: The warm eggs being at the bottom, and the air current being down, it would be carried from the bottom of the corridor up through the fan and back to the cooler eggs at the top, and you will depend upon the general diffusion and action of the fan for transferring the heat by the air. That is, the air was moving in a cycle in the Boling-Jensma machine, and the air, as it left the fan, struck first the cold eggs and then went to the hot eggs, then, from the hot eggs to the fan, then back to the cold eggs, and then the heat was carried from the hot eggs in the other half of the cycle than what it is in the Smith.

The next block is labeled "Robbins arrangement at the end of the hatch." Here we show fourteen eggs high, and you will note that the eggs are sandwiched for the different stages of incubation. There are five or six or seven stages here, and they are sandwiched at different points through the machine. That is, there was no regular order of setting, except to balance the turning device that he had in the machine.

The Court: I do not understand the purpose of showing the condition on one day, and then one day later.

The Witness: I will be glad to explain that. Wherever there are twenty-two day eggs shown, that represents the chicks that are out of the shell or chicks that are emerging from the shell. Now, as soon as those are taken out, then [fol. 179] the machine is operating just as the Jamesway machine is operating, without any eggs hatching in there; and in the case of the Jensma machine, after the eggs were taken out—after the chicks were taken out, then the oldest eggs in the machine were in their sixteenth day, and there was no eggs hatching in that machine; that is, there was no chicks actually coming from the shell until the twentieth

day, and you had the same comparable condition as you have in the James machine during that period.

My Ely: The process goes on just the same, your Honor, whether the chicks are hatching or whether they are not.

The Court: Yes, I understand the point.

The Witness: Now, the condition of the air movement in the Robbins machine was different from that in the Smith, in that the fan was a large fan, five feet in diameter, and was arranged on the wall instead of in the ceiling. These blades, these long blades at the side, represent the fan on the side wall which was five feet in diameter and which rotated at 200 to 210 R. P. M. Now, it forced the air centrifugally off of the ends of the blades to the floor, to the ceiling, and to the side walls. It carried it to the front of the machine, carried it to the opposite side of the machine from the fan, and then it was drawn back across the eggs in these different stages of incubation. So that the air after it left the fan, would only contact the eggs in one or two stages of [fol. 180] incubation until it got back into the fan again, where it would be sent out again on another cycle, and on the next circuit it might contact eggs in an entirely different stage.

The witness then resumed under direct examination by Mr. Ely as follows:

That is, the arrangement of the eggs and the passing of the air is quite different in the Robbins machine than it is in the present Jamesway machine.

The Court: Why would it not contact the same eggs? You have the same kind of current, do you not?

The Witness: The speed in this machine was quite a bit stronger than it is in either the James or Smith machine, and the air was strong enough to carry to the front of the machine, which was out six feet, and then it would be drawn across the trays. Now, one time that particular current of air might cross the top tray. On the next circuit it might cross the bottom tray, or an entirely different one, because it would have to pass through the fan, which was continually rotating and throwing it out centrifugally.

The Court: I see; it might draw it in at some different point?

The Witness: Yes.

The witness thereupon resumed as follows: I will not mention the Robbins arrangement one day later, because it simply corresponds to what has been explained before.

[fol. 181] Now, in the left-hand block on the center series, we have the arrangement in the Snow incubator, and there the same type of fan was used as in the Robbins, except that they had fans on two walls. There they had a cabinet almost exactly like the Smith cabinet in size, and they had fans on the walls instead of in the ceiling, but the arrangement of the eggs were sandwiched the same as in the Robbins arrangement. The air movement is substantially the same as in the Robbins; the method of moving was the same, and in that case the Court has held that it was an infringement. The Snow arrangement one day later has already been explained. It corresponds to the other cases. On the next block we have the arrangement in the Buckeye No. 48. This shows a type of arrangement similar to that in the Smith. Now, as I explained to you yesterday, they can sandwich the eggs in that machine, and it is recommended by the company that they do do it, although there have been times when they did not sandwich them. Then, in the next block, we have the Buckeye 310-A. That is the case in which the oldest eggs in that machine are in the eighteenth day period, and in that case the eggs are sandwiched. The heat transmitted from the hot eggs to the cold eggs in that by continuous cycling and recycling of the air. That is just as the Jamesway shows in the catalog; it does not make any difference how you arrange the eggs in the machine, you get the results. That is correct. The bottom arrangement shows the Jamesway incubator at different periods. The arrangement on the left is the arrangement that was used in one of the affidavits furnished by the defendant in opposing the preliminary injunction, and you [fol. 182] will note there that the fan is at the top, but it throws the air out centrifugally where it passes down; it is conducted down the two sides to the bottom; thence upward through the eggs in repeated cycles, and the air will be transferred there, or the heat will be transferred there in just the same way that it would be in the Buckeye 310-A, or in several of these other arrangements.

Now, I have also shown in the next block, the Jamesway one day later; that is, one day later you will have a different arrangement of eggs, so far as their heat-producing

qualities are concerned. That is, I have taken out 17½ day eggs that go to the hatcher and replaced them with fresh eggs, and that gives you a different shakeup of the eggs. The next column shows three and one-half days later than the left-hand arrangement. We have the same eggs in there that we had in the second block, but they are older; and then in the fourth block we have the arrangement one week later than our first block. Arrangement keeps changing from time to time, but the air is continually circulating in the repeated cycles over and over again, and the heat transfer takes place in just the same manner. That is still another mix-up of the eggs. I do not remember exactly what they said in the affidavits about what decided the particular permutations of eggs with respect to each. It was in the thousands. In any one of those thousands of permutations or order of egg arrangement, you get this transfer of heat. Due to the recycling of air. Now, there are some little marks here that I did not call the Court's attention to in each one of these drawings, those little inlets and outlets. [fol. 183] In the upper left-hand one, which was the Smith arrangement, you will note that immediately above the fan there is an arrow showing intake, and above the eggs an arrow showing outlets. That is the restricted outlets of the patent. Yes, restricted openings for intake and exhaust of air. Then, going to the Boling-Jensma arrangement, which is in the third block, you will note that the outlet is directly above the fan. Now, the intake in that case was immediately below the bottommost eggs on the side here where the air would be drawn in there and up through the fan, mixed with the warmer air before it contacts the eggs.

Then, in the Robbins arrangement you will note that the intake is on the right-hand side, directly back of the fan, so that the air that comes in there will be thoroughly mixed with the air before it strikes the eggs, and the outlet is in the top. Then, when we come to the Snow arrangement, the inlet is directly back of the fan and the outlet is in the top.

In the Buckeye arrangement, the inlet and outlet are, as in the Smith arrangement, in the upper left-hand corner. Down at the Snow again—Jamesway, I should say, the inlet is at the bottom and the outlet is at the upper left-hand corner. The inlet is directly underneath the air mixer which mixes that air with warmer air before it con-

tacts the eggs. That is, in every case, including Smith and these others, and even including the Jamesway, the cool air enters the machine, which is mixed with a current of air as it goes around the cycle. It has to be or you will have cold spots in the machine. And that is true in the Jamesway; the difference is that the Jamesway has a sepa- [fol. 184] rate instrumentality to do that mixing of the cool air.

(Counsel for the plaintiff then offered in evidence the Egg Arrangement Chart mentioned by the witness and the same was admitted and marked Plaintiff's Exhibit No. 27.)

The witness then resumed under direct examination by Mr. Ely as follows:

Now, taking that Exhibit 27, in the operation of the Smith incubator, we set twice a week, at three and four day intervals. Now, that means that chicks are hatching about three days out of the week. There is chicks emerging from the shell about a day and a half—about three days, yes, for each period. And during the rest of the time, during the other four days, there is no actual hatching of chicks going on in the Smith Incubator, that is, there are no chicks actually coming from the machine. That does not make any difference as to the operation of the machine, the process. In the Buckeye machine, take this Buckeye 48 machine, they set once a week, and that means that about a day and a half out of a week chicks are hatching from the machine, and during the remaining five and one-half days, no chicks are hatching. And during some of the time our eggs are in there, the oldest egg in that machine will only be sixteen days old. That does not make any difference in carrying on our process. As a matter of fact, in general parlance, the word "hatching" covers the entire period, the entire 21 days. That is, a hen starts hatching eggs the minute she sits on the eggs. And we start [fol. 185] hatching our eggs in the incubator as soon as you bring them up to temperature. Then, the hatching process starts. And the hatching process continues twenty-one days. I have reference in their books, in the defendants' books, to this matter of the terminology of the word "hatching" that I want to refer to, yes, sir, I have lots of them. A very good one to start with would be the first

book in the group, which would be a small book in the beginning. It is called, "Operating Reference Book." They apparently were issued at different times. They are almost identical, the first three, I believe, or four; they were put out in different years apparently. If you will turn to page 16, which has their temperature for hatching, and start to read that paragraph, "Bear in mind that eggs are more easily damaged in the first few days of hatching than in the later stages.". Now, if you drop to the next paragraph below that, the next to the last line, a statement is made, "Check these temperatures twice daily in starting the hatch."

In the next paragraph it reads, "Carefully increase the compartment temperatures as the hatch progresses." On the next page in the second paragraph, the last line, it refers to "The last of the hatch", and in the next line it refers to "during the latter part of the hatch".

There are numerous illustrations of this kind all through this book. If you will just turn back to page 11, at the top of the page, it says, "With smaller capacities it is usually desirable to start the hatch each week, filling about one-third of the machine for each hatch. Under such conditions, it is well to start the hatch." You have countless [fol. 186] examples of that, through the books. On page 4, in the third paragraph, under "Incubator Ventilation", it refers, in the second or third line, to "The period of the hatch." Later on it states, "During the first ten or twelve days of the hatch and during the latter part of the hatch."

There are repeated illustrations through all these books where it refers to "the first few days of the hatching", or "the first day of the hatching". Some of them refer to "the tenth day of hatching," while they are hatching eggs in the Jamesway incubator. There is not doubt whatever about the fact that they are hatching eggs in the Jamesway incubator. The definition of the word "hatch" is to cause to develop in and come forth from eggs.

I have a chart here showing the steps in the process of hatching eggs as carried on by the hen and as carried on by the prior art, and then as carried on in the Smith and Jamesway. I will just produce that chart and refer to it briefly. At the top of the page I have pointed out four steps that are necessary to hatch the eggs of the domestic fowl: proper temperature, moisture within the egg must

be conserved, sufficient fresh air, and the egg must be turned from time to time.

Now, in the left-hand column, I have pointed out the various steps that the hen uses in her natural method of incubation. 1: The eggs in her nest are all in the same stage of hatching. 2: The eggs are all arranged at one level. 3: The heat is applied from above. 4: The nest under the eggs is several degrees cooler than the hen's body. 5: The eggs are protected from drafts. 6: The eggs are cooled once or twice daily. 7: The temperature within [fol. 187] the nest increases as the hatch progresses. 8: Moisture is conserved by restricting air movement. 9: The eggs are turned frequently by rolling or shuffling.

Now, in the next column I show the methods used by the types of incubators in commercial use in 1915, and they follow the teachings of the hen in each of those nine steps. The eggs were all set at one time; they were all on the same level; the heat was applied from above; the air below the eggs was several degrees cooler than that above; the eggs were protected from drafts; they were cooled once or twice daily; the temperature within the cabinet was raised each week as the hatch progressed; and moisture was conserved by restricting the air movement. All air entering the incubator passed through the incubator once and was exhausted to the outside; and the eggs were turned frequently by rolling or shuffling.

The next column represents the Smith development. Smith revolutionized the whole theory of incubation. He broke away from the prior art in practically all of these steps. First, he had eggs in different stages of incubation. He had eggs at different levels. He applied heat to all sides of the eggs; the air was the same temperature above as it was below the eggs, substantially. He got away from drafts by applying forced drafts over the eggs. The early eggs were protected from drafts. He broke away from that by applying froced drafts about the eggs. He did not cool the eggs once or twice daily. He does not cool the eggs at all, and he changed the temperature of the cabinet each week as the hatch progressed; and he conserved moisture; [fol. 188] he restricted the air inlets but did not restrict the air movement. And he caused the air to move forcibly through the machine all the time. He restricted the amount of fresh air that could come in. He did not restrict the

air movement about the eggs themselves. He broke away from the turning, or the rolling or shuffling of the eggs by tilting them on the little end; and he utilized the heat of the eggs in the advanced stage to help heat those in the earlier stages, and by the same way, he used the heat-absorbing powers of the eggs in the earlier stages to help cool those in the advanced stage. Now, those things, 10 and 11, those are brand new in the incubator art in the fourth column we have the Jamesway incubator follows the teaching of Smith using the same identical steps. Each one of those steps are, word for word, the same, if I remember correctly, as the steps practiced by Smith.

(Counsel for the plaintiff then offered in evidence the Taggart chart showing steps in process of hatching eggs as carried on by the hen, and as carried on by the prior art, and as carried on in the Smith and Jamesway, and the same was admitted and marked Plaintiff's Exhibit No. 28.)

The witness then resumed under direct examination by Mr. Ely as follows:

The effect this Smith invention had upon the incubators of the type in commercial use in 1915 was it has rendered practically all those incubators obsolete. A very small per-[fol. 189] centage of them are still in use. Very few of that type are sold nowadays. And this defendant stuck to that old type of incubator up to about 1928 or 1929, and then he went over to the Smith type of incubation process, I noticed patent plates on the Smith and Buckeye machine while we were down there yesterday. To my knowledge, those machines been marked, both by Smith and Buckeye, and under this patent in suit for eleven years, to my knowledge. That is long prior to the time that the Jamesway Company started making these incubators charged to infringe here, I don't remember the exact date we purchased the Jamesway machine which we had, I think it was in the spring of 1930.

Mr. Toulmin, Jr.: You do not have to prove the machine. We admit our machine, your Honor.

The witness resumed under direct examination by Mr. Ely, as follows:

Generally, in the commercial incubators throughout the country, the percentage of commercial machines now, so

far as I know, that operate upon the principle of the Smith invention is approximately 75 per cent. That is part of the knowledge I get from running our business. We know what we have sold, and we know what our licensee has sold, and by our checkup, we know pretty well the total egg capacity in the country.

Now, in the Jamesway incubator, which we have been discussing, they hatch a plurality of eggs. They arrange those [fol. 190] eggs at different levels, I mean by that, well, in the old style incubators, eggs were all on one level, and in the Jamesway, they are arranged at several levels, one tray of eggs above another. That Jamesway incubator has a closed chamber. And it has restricted openings in that chamber. Those openings are of sufficient capacity for the escape of foul air without undue loss of moisture. I mean by that, that the air within the machine must be kept at a certain humidity. If you have too dry air around the eggs, it will dry the eggs out too rapidly; so that by keeping the humidity right, you prevent the moisture from evaporating from the eggs themselves too rapidly. That is, by having a very small opening and a small percentage of air interchange, you preserve the body of moisture which is in that air circulating through the cabinet. Now, the Jamesway machine applies a current of heated air to the eggs and that current of air is created by some means other than the variations of temperature. That is, it is created by the fan in the top of the incubator, and the movement of that air is of sufficient velocity to circulate, diffuse and maintain the air throughout the chamber at substantially the same temperature, in fact, the Jamesway catalog said practically that, in something I read the other day, almost word for word, and the air is vitalized, the moisture conserved. It is conserved by restricting the interchange of fresh air. The units of heat are carried from the eggs in the more advanced stage of incubation to those in the less advanced stage, for the purpose specified, that is, hatching eggs. Referring to the second claim, the Jamesway incubator [fol. 191] utilizes a power-driven current of heated air. That power-driven current of heated air is created in an adjacent chamber. That adjacent chamber, in the Jamesway machine is a fan chamber at the top of the machine. That power-driven current of heated air in the adjacent

chamber moves through openings into the egg chamber. Those openings in the egg chamber are at the bottom of the ducts at the sides, at the front and rear of the machine. Referring to the third claim, the Jamesway machine applies a vertically directed current of heated air to the eggs. That vertically directed current is in an adjacent chamber. The ducts at the front and rear of the cabinet are adjacent to the incubator chamber. This current of air that is in the adjacent chamber moves into the egg chamber through upper and lower openings between the chambers. That is, the egg chamber is the chamber in the center, and the other chamber is either one of the chambers on the side of the corridor. There are upper and lower openings between those two chambers. The upper opening in the Jamesway is into the eye of the fan and the lower is at the bottom of the incubator chamber—egg chamber. That current is created by mechanically moving means. Referring to the fifth claim this machine of the Jamesway is an incubator. It has a closed chamber. It has a vertically disposed partition to provide a corridor. There is a vertical partition at the door in the front and at the back of the cabinet, behind—two vertically disposed partitions separating the egg chamber from the air passage. Those partitions provide two corridors. There is at least one corridor. And that has got openings into the upper and lower passageways to the chamber. There is a corridor here on the [fol. 192] side with a passageway at the bottom, and also a passageway at the top, out into the corridor on the other side. And that has egg trays arranged at different levels in the chamber. It has a power-driven fan. That power-driven fan creates current in the corridor. That current that is created circulates through the passageways and egg trays. The chamber has restricted openings for the intake at the bottom of the chamber and for the outlet is at the upper lefthand point, or regular outlet in the incubator. Those restricted openings are of sufficient capacity for the discharge of foul air without the loss of moisture, and they can be regulated. They are regulated, as a matter of fact, from large to small, according to the weather conditions. There are means to heat the air circulating through the chamber. They are the heating pipes shown here at the top. There is also an electric heating ring,

electric heating element. I have been referring in these answers, to the chart, Exhibit 14.

This concluded the direct examination of the witness Joseph I. Taggart.

ANDREW H. DORENKOTT

By agreement of Counsel the next witness ANDREW H. DORENKOTT, called as a witness on behalf of Plaintiff and sworn, testified as follows:

Direct examination.

By Mr. Ely:

My age is forty-three, and my occupation is, Auditor for [fol. 193] the Smith Incubator Company. I live in Fairview Village, that is a suburb of Cleveland. My duties with the Smith Incubator Company are: Keeping the records with reference to the accounting of the Smith Incubator Company. In that connection, I keep a record of the number of machines manufactured and sold by the Smith Incubator Company under this patent. And I also have access to the records, or have care of the records with respect to the royalty payments made by Buckeye Incubator Company under the patent. The royalties paid by the Buckeye Company are paid to Dr. S. B. Smith. I keep the records for Dr. Smith. I check the matter of the number of machines manufactured and sold by Buckeye and the royalties paid at various periods from the records furnished Dr. Smith by Buckeye. I check those with Buckeye's shipping records. Now, I am asked to furnish a list or tabulation of the number of machines and the value of the machines sold by both Smith and Buckeye. I have that with me. This is the report to which I refer.

Buckeye Incubator Company started paying royalities to Dr. Smith in 1917. My tabulations on the payments of royalties carry into July, 1933. 10,400 units have been manufactured and sold by Buckeye Company during this period, under the royalty agreement. The value in money of those units is $11,908,530.61. I have for some time kept track of the egg capacity of those Buckeye units. We have checked the egg capacities as far back as could be checked

from the time we started keeping this record. And so far as known, egg capacity is concerned, the egg capacity of the Buckeye incubators which have been sold under the [fol. 194] Smith Patent is 100,144,256. With respect to the Smith incubators which are manufactured and sold by Smith Incubator Company, from 1922 to August, 1933, the number of units was 1,905. During that period, the total value is $12,318,094.26. The egg capacity is 91,033,000. And summing up the total of the two, the combined total units, 12,305; the sales value, $24,226,624.87; the egg capacities, 191,177,256. I went down this noon, and saw the machines which we had introduced in evidence here in this case, among them the 310-A machine. That is the 310-A Buckeye machine, known as the incubating machine. The Buckeye Incubator Company pays royalties to Dr. Smith on machines of that type. That is, there are the two types, the one in which the 21-day hatching is carried out, and the one in which the 18-day hatching is carried out, and they pay on both of those types.

(Counsel for the plaintiff then offered in evidence the witness Dorenkott's Tabulation of number and value of machines sold by Smith and Buckeye which was admitted and marked Plaintiff's Exhibit No. 29.)

The witness then resumed under direct examination by Mr. Ely as follows:

I know that the Buckeye Company paid royalty on those eighteen-day incubators, because within the last year I have checked the royalty reports furnished Dr. Smith by the Buckeye with their shipping records, and in those reports were indicated the 310-A and 510-A. And the 310-A and 510-A are the incubating units and they pay royalities on them.

[fol. 195] Cross-examination.

By Mr. Toulmin, Jr.:

I am asked if I receive any royalties from Buckeye Incubator Company on the so-called separate hatcher of the Buckeye Incubator Company. I have no recollection of ever seeing any separate hatchers reported on the reports. I am shown that letter of the Buckeye Incubator Company of June 30, 1931, with an attached circular, and asked to

look at that and see if that is a machine of the type on which the Buckeye Company has been paying royalty or has not been paying royalty. I have never seen their hatching unit, a separate unit. I cannot say if this has ever been included in their royalty reports. All I know is the numbers of the machines on which they are to pay royalty. These are given to me and I check them with their records.

In making this report to the Court as to the commercial operations of Buckeye and Smith, I have no personal knowledge as to the mechanism involved upon which the reports are based, nothing as to the mechanism of the particular incubator that is, Buckeye Incubators—other than that. I do know that, on which they pay royalties. And I only know that, however, on the basis of the number of the machine, by the serial number and its model number, but I do not know the internal construction. No, I don't know the internal construction, not of the hatcher. I did, of the incubator, because I have seen several of these incubators. But so far as I know, I do not know anything about the separate hatcher of Buckeye. I know the numbers I have checked covered the incubating units; that I [fol. 196] am positive of. I can only identify the numbers which I have checked, where they have paid royalties. I am asked if Buckeye has paid royalties on any separate hatchers, I don't recall them ever paying any. I don't know the numbers they go by, because I have never checked the separate hatching units, on account of not having them on my report.

Mr. Ely: There is no argument about that, Mr. Toulmin. They do not pay on their separate hatchers. We do not claim that your separate hatchers infringe, so I do not see the materiality of the point.

Mr. Toulmin, Jr.: I am not asking about ours. I am asking about Buckeye separate hatchers, and I would like to have this witness, who comes as an accountant and makes a report, answer that question, if he can. If he cannot, let him say so.

The Witness: The units on which Buckeye pay royalties are 310-A and 510-A. Now, if they are hatching units, then they paid royalty on them.

The witness then resumed under cross-examination by Mr. Toulmin, Jr.:

Those are the units on which they paid royalties, the numbers are 310-A and 510-A.

Redirect examination.

By Mr. Ely:

They pay royalties on incubators. I am referring to the incubating units in connection with hatching units, [fol. 197] when I answer that question. They do not pay any royalty on the hatching units to which the eggs are transferred at the end of the process, on the 310-A and 510-A. They have never paid royalties on those.

This concluded the testimony of the witness Dorenkott.

* * * * * * *

At this point it was agreed that Frederick Bruce Hutt might be put on the witness stand as a witness on behalf of the defendants.

FREDERICK BRUCE HUTT

FREDERICK BRUCE HUTT, being called as a witness on behalf of defendants, and sworn, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

Q. Will you state your name and residence?

A. Frederick Bruce Hutt, of St. Paul, Minnesota.

Q. And your occupation?

A. Professor of Animal Genetics and Poultry Husbandry in the University of Minnesota.

Q. You are a Doctor of Philosophy, are you?

A. Yes.

Q. How long have you been at the University of Minnesota, Dr. Hutt?

A. Since the fall of 1928.

Q. Will you sketch very briefly your educational qualifications, with particular relationship to matters of poultry, [fol. 198] or eggs and embryology of eggs?

A. Well, I have taken the course in agriculture offered by the University of Toronto at its Agricultural College at Cuelph, Ontario, and got the usual undergraduate training in agriculture, specializing in poultry husbandry and animal husbandry.

At the same time, I kept a considerable number of poultry on my father's farm at Georgetown, Ontario. In fact, I financed my college expenses that way.

Following graduation, I took a position at the University of Manitoba, Winnipeg, as lecturer in poultry husbandry. After fifteen months, I went to the University of Wisconsin, where I spent one academic year in post graduate study in genetics and zoology.

On my return to Winnipeg, I took part time work in zoology at the University of Manitoba for two years. In the summer of 1927, I went to the University of Edinburgh and spent one calendar year there and some three days, studying animal genetics and physiology of reproduction.

Q. What degrees do you hold?

A. From Toronto, Bachelor of Science and Agriculture; from Wisconsin, Master of Science; from Manitoba, Master of Arts; from Edinburgh, Doctor of Philosophy.

Q. Did you recite—I do not think you did—the professional positions you have held in connection with the teaching of these subjects?

A. Yes, lecturer in poultry husbandry at the University of Manitoba, and extension poultryman for the Manitoba Department of Agriculture at the same time. At the Uni- [fol. 199] versity of Minnesota, successively, Assistant Professor of Poultry Husbandry, Associate Professor of Poultry Husbandry, and now Professor of Animal Genetics and Poultry Husbandry.

Q. At what institution, Minnesota?

A. At Minnesota.

Q. Are you a member of any learned societies in this branch of science?

A. Of the American Association for Advancement of Science, the Canadian Society of Technical Agriculturists, the American Society of Zoologists; the American Ornithological Union; the American Genetic Association; The American Society of Geneticists, and some other general honor scientific societies.

Q. What is your particular field of research in this general art?

A. I have two main fields of research. The first is to find causes of embryonic mortality in fowl, to reduce the tremendous losses from eggs that fail to hatch; and secondly, the study of heredity in poultry, with particular reference to characters of economic value.

Q. Now, Dr. Hutt, will you describe to us what takes place in the incubation of an egg from the first day that incubation starts, to the last day when the chick hatches?

A. At the stage when the egg is put in the incubator, it is in what the embryologists call a gastrula, which is somewhat like a raspberry cut in two, and in the next 96 hours, practically all of the organ systems of the chick are established. By 36 to 40 hours, the heart is developed and beating; blood is formed, and the circulation outside of the chick is united to the blood vessels in the chick. The embryonic membranes are formed and begin to spread out [fol. 200] over the yolk. The embryonic function, the embryonic function coating, is brought into action. The eyes are distinctly well advanced by the fourth day. The different regions of the brain are formed. The limb buds from which the wings and legs grow, are formed, and the embryonic membranes are started on their course of development.

Thereafter, development consists largely of expansion growth of these organ systems that are laid down as they assume their final form found in the chick on hatching.

There is an outward visible change at ten days, ten and one-half days, when the down first is found. So far as the physical position of the chick goes, there is a change. When it is incubated the first day or two, the chick lies at right angles to the long axis of the egg, and the head directed to the observant's left when the small end is pointed away from the observer. As development proceeds, the embyro turns on its left side, with the exception of some abnormal cases, where they lie on the right side, and it is in that position until about the fifth day, when it begins to show a certain amount of movement; and from the fifth to the eleventh and twelfth day, there is a considerable amount of movement. At that time the chick is parallel to the long axis of the egg, and that is the position in which it is found normally at hatching.

At seventeen and one-half or eighteen days the process of hatching is begun. That consists of the drawing into the abdomen of the yolk, which has not been utilized for food up to that period. At a little later date, on the 20th day, sometimes on the 19th day, the chick begins its mechanical [fol. 201] process of hatching. It lies at that time with the head tucked under the right wing and the beak directed toward the air cell. The air cell is a space between the two shell membranes which is formed by the evaporation of the contents of the egg after laying. The beak is directed forward. I am describing now the normal position. We have deviations from this that are pathological.

The beak is thrust forward and enters the air cell. Up to this period, the chick has not been breathing through its lungs. When the beak enters the air cell, it begins to breathe through the lungs.

Following a rest period, the chick thrusts the beak and head against the shell and normally succeeds in, as we say, pipping it. After this is done, with intervals for rest, the chick rotates on its own axis around in the egg. Its position in the egg is much like that of a trussed fowl: the two legs are drawn up on either side of the breast; the feet are pointed outward. It is by moving these feet that it works its way around the shell, breaking the shell three-quarters of the way around, or slightly more or less. By that time it can get the head out, and by movement of the head and wings, can effect its withdrawal, which completes the hatching.

Q. How much of these operations that you have just described, takes place beginning about the 17½-day to the end of the operation?

A. I would not say that the process of hatching began on the 17½ day, but on the 18th day. Then the inclusion of yolk begins, and from then to the 21st day, we have the process of hatching.

[fol. 202] Q. And what do you mean by inclusion of yolk, Doctor?

A. The yolk at that time is enclosed in the embryonic yolk sac. It is just a membrane put out by the embryo and folded around it, and that is drawn in by what is commonly called the umbilicus, into the abdomen of the yolk, and it carries the yolk with it.

Q. Do you mean abdomen of the yolk, or abdomen of the chick?

A. Abdomen of the chick.

The Court: Does this embryo form on the outside of the yolk, or work inside the yolk?

The Witness: In the entire stage it is on the outside of the yolk.

Q. And during this period of 17½ to 18 days, on to the end, what conditions of temperature are occurring, so far as the chick and the egg are concerned?

A. The temperature tends to rise as a result of the muscular work that is being done.

Q. And how does this amount of temperature compare with the temperature that was generated in the previous period of the egg's history?

A. It is very much more.

Q. And what is the relative condition as to humidity between the period prior to the 17½ or 18 day and subsequent thereto? Is the period subsequent thereto one of demand for greater humidity or lesser humidity?

A. It is desirable to have relatively high humidity to prevent the shell membranes and the embryonic membranes from drying out and imprisoning the chick.

Q. Now, with reference to the period of, say, from the tenth to the seventeen and one-half or eighteenth day, is [fol. 203] that period the most critical period in the history of the egg, or are there other periods that are more critical, on the basis of mortality?

A. Other periods are more critical.

Q. What is the critical period, or what are the critical periods in the history of the egg from the first to the twenty-first day?

A. We have a little peak of mortality at from three to five and one-half or six days, a slight rise in the mortality curve, but the greatest mortality occurs from the 18th to the 21st day. In that period, in my own findings, 47 per cent of all the mortality occurs.

Q. Have you had any experience with the old type of incubator having the single tray and the lamp, such as described by Mr. Taggart here during the last several days that you have been sitting here?

A. Yes.

Q. Will you, in turn, tell the Court whether you have had any experience with that type of incubator in placing in the single tray eggs of more than one age?

A. Yes, I have done that.

Q. Will you tell the Court how that happened and why you do that?

A. I think it happened, first, because when I had a few eggs that I did not have clucking hens available to brood them with, I got the agricultural college, near which I lived, to allow me to put them in one of their machines, and later I worked at the Agricultural College and operated their incubators, and then I would sometimes, if I had one hundred sixty or seventy eggs to set, and a 145-egg incubator to put them in, I would fill up my 145-egg machine and put the remaining 25 in another one until I had candled out the first [fol. 204] machine and removed the infertile eggs, when all could be restored to the one original machine.

Q. And then you had eggs of different ages in the same incubator?

A. Yes.

Q. About how long ago was it that you did that?

A. 1913 and 1914 my first, and 1918, later——

By the Court:

Q. They would not be eggs of different age, would they? You said you had 160 and 147, or some such number, you put in one incubator, and the others you put in another?

A. The other machine into which I put the surplus was one containing eggs that started to incubate at an earlier age, but which had been candled and the infertiles removed.

Q. I thought, as you first expressed it, it did not explain your last answer.

By Mr. Toulmin, Jr.:

Q. You might also tell the Court your age. I forgot to ask you that.

A. I am thirty-six.

Q. You said you used the income, during this period, from your incubation operations, to finance yourself in college as you grew up?

A. During the four years I was going to college, yes.

Q. Are you familiar with what the poultry men and scientists refer to as bacillary white diarrhea?

A. Yes.

Q. Will you describe to the Court, very briefly, what disease that is?

A. It is a disease caused by the organisms salmonella pullorum.

The Court: What does that mean?

[fol. 205] The Witness: It is the name of a bacteria.

Q. Go ahead, Doctor.

A. This is carried from one generation to another in the ovary of the hen, and sometimes in other organs. Hens infected can lay eggs containing the organism. When these eggs hatch, the chicks in turn can carry the organism, and they can, in turn, infect other chicks, and some survive; so that the disease is perpetuated from one generation to another through the egg.

Q. And how is the disease acquired by the healthy chick, from some source of infection; is it by mouth?

A. They can acquire it by picking at the droppings of infected chicks, and they can acquire it in incubators in which diseased or affected chicks are hatched, by inhaling bits of down, that are floating about in the incubator.

Q. What effect upon the distribution of the disease has the use of air that is blowing through the incubator during the hatching of the eggs?

A. Well, inasmuch as it spreads this down all through the machine it greatly increases the opportunity for infection and does increase the incidence of the disease.

Q. As I understand it, a chick may inhale bits of this down, the disease travels through the pulmonary tract, and eventually finds its way for its disease functions in the bowels of the chick, is that right?

A. Yes. Of course, I should qualify that by saying that this only occurs if there are diseased chicks in the incubator or eggs carrying the disease.

Q. Now, in your practice, in the course of teaching at the University of Minnesota, what do you teach at the uni-

[fol. 206] versity on the question of whether or not to hatch separately or hatch all eggs in the incubators in which the other portion of the incubation has been done?

A. I have to be very careful in my position about saying anything that would be directly antagonistic to one machine and used as a sales point by another. So what I do

is point out to the class that this disease, which is considered one of the worst to which chicks are exposed, is spread in that type of machine.

Q. What do you mean by "that type of machine"?

A. One in which the down is circulated about.

Q. One in which air is flowing during the hatching period?

A. Yes.

Q. You yourself, in your hatching at the University of Minnesota—I assume you do some hatching?

A. Yes.

Q. You yourself, do you practice the plan, customarily of hatching separately, or do you hatch all in the same cabinet with the incubating eggs?

A. We hatch separately from the incubating cabinet.

Mr. Toulmin, Jr.: That is all of the witness; you may ask him.

Cross-examination.

By Mr. Ely:

Q. How old did you say you were?

A. Thirty-six.

Q. Thirty-six? Where did you live during your boyhood?

A. Guelph, Ontario.

Q. Then anything which you did in 1913, you did up in Canada, did you?

A. That is right.

[fol. 207] Q. And do you have any authority in the text books for a division of the 21-day period of hatching or incubation between the last three days and the first fifteen or eighteen days?

A. Yes.

Q. Is there any authority for you in that statement?

A. I am not quite sure what you mean by authority.

Q. Have you any authority for the statement, or do I understand you to say that the period of the first eighteen days is not part of the hatching period?

A. Yes.

Q. That is not part of the hatching period?

A. No.

Q. And the last three days are the hatching period?

A. Yes.

Q. Now, do you know what the custom was with regard to the use of those words in 1915?

A. To that I can only reply that I am not aware of any change in the concept in that period or since that period.

Q. Then you do not know whether, in the year 1915, the word "hatch" meant the whole 21-day period, or, as you say, now, it means only the last three days?

A. I am not familiar with the use of the term "to hatch" to mean the whole 21-day period.

Q. You never heard of a hen hatching eggs when she sat on her nest—you would not say she was hatching eggs when she sat on the nest the first three days?

A. I would say she was sitting, but I would not call it hatching.

Q. Would she be performing the operation of hatching on the first day?

A. Oh, no.

Q. On the second day?

A. No.

Q. On the third day?

A. No.

[fol. 208] Q. When would she start to perform the operation of hatching?

A. When those chicks in the eggs begin to hatch.

Q. And would you say the chicks were hatched on the 21st day?

A. Ordinarily.

Q. And you would say that people generally consider the period of 21 days divided, eighteen days of some period or other, and three days hatching period?

A. No. It is commonly said the incubation period for the fowl is 21 days, and that can be separated into the period of growth and development, and finally, the last process of hatching, which is the same as saying the gestation period for a calf is nine months, but the birth period is the matter of a few hours.

Q. You think the word "hatch", then, is the same as the word "birth"?

A. To me.

Q. Do you have any authority for that, any good authority, except yourself?

A. That is the general concept among biologists——

Q. Wait a minute. Have you any authority for that? I am not asking you your opinion. I am asking what your authority is. I understand what your opinion is, but I want to know what your authority is.

A. May I ask what kind of authority you would like?

Q. I would like some authority other than your own opinion?

A. You mean a text book?

Q. Yes.

A. Oh, yes, there are lots of them.

Q. Have you those text books with you?

A. Yes.

Q. Can you tell us what they are?

A. Yes. You can get "Lippincott Poultry Production;" "Jull Poultry Husbandry."

Q. When was that published?

A. 1930.

Q. That is a recent book?

A. Yes.

[fol. 209] That was not published back in 1915, at the time this patent was drafted. All right, what else?

A. I think the best other one is Lippincott's Poultry Production.

Q. And when was that published?

A. Fourth Edition, the latest, 1927.

Q. You have not any authority that goes back to that time, that you can point to, have you?

A. Well, I can find lots of places with instructions for incubation which will say "at hatching," this procedure, "such and such procedure must be followed."

Q. Have you found any authorities in your rambles through the books, and so forth, where they refer to the entire period of 21 days as hatching period?

A. No.

Q. You never found any such authorities?

A. Not that I am aware of now.

Q. These books that were published in 1930 and 1927 have been since this B. W. D. became such a pest, have they not? This B. W. D. has not been recognized as such a pest until within the last few years, has it?

A. Since about 1915, as I recall it.

Q. And later on—as a matter of fact, did not the study of B. W. D. particularly start about 1928?

A. No, it did not.

Q. You want to say that, do you?

A. Yes.

Q. You want to testify to that fact?

A. Yes.

Q. And this idea of separate hatching, you might say, would be an improvement on what has been done before. That improvement took place about 1927 or 1928; is that what you want to testify to?

A. I am not quite clear what the question is that you would like me to answer.

Q. You claim, as I understand it, that the idea of hatch- [fol. 210] ing chickens in a separate enclosure is an improvement over hatching them in the same enclosure with the incubating eggs?

A. I have not claimed that. I have said that I do it.

Q. Well, do you think it is an improvement?

A. Yes.

Q. And that is an improvement, which, so far as you know, originated about 1927 or 1928?

A. Oh, no, that has been done before that.

Q. Then there is nothing new in this idea of hatching chickens in a separate container from the ones the eggs were incubated in?

A. Well, I wouldn't say that it is necessarily a new process.

Q. Now, you say it is desirable to have a high humidity at hatching time; is that necessary?

A. Yes.

Q. It is necessary, you say?

A. Yes.

Q. You could not carry on incubation without that?

A. Oh, yes, you could get some chicks out, but you get a higher number of proportionate chicks if you have high humidity.

Q. That is, that is an improved way, perhaps, of operating?

A. Yes.

Q. Is it to increase your humidity?

A. Yes.

Q. Do you know when and who suggested the idea of increasing humidity at hatching time?

A. I can't tell you. When I ran my first incubator, I was told to do it, and have done it ever since.

Q. That is an old trick, too, is it not?

A. Yes.

Q. That is an old trick in the trade, is it not?

A. Yes.

Q. Now, this B. W. D. is transmitted between the infected and non-infected chicks even in the hen's nest, is it not?

A. I would rather, say, after they get out of the nest. [fol. 211] Q. But even in the hen's nest, you have the transmission of the disease while the chicks are in the nest?

A. No, there is not likely to be infection in the nest, but in the brooder, after they get out of the nest.

Q. But is there not infection in the hen's nest when your chicks are in there, after they came out of the shell, and while they are still in the nest, there will be infection back and forth?

A. There will be infection there, but the chicks are less likely to pick it up until they get out.

Q. And there is also infection occurs in the still air incubator?

A. Yes.

Q. This bacillary white diarrhea which lands on the down is sufficiently light—the down is sufficiently light so it floats even in the air of the incubating chamber, if it is still air?

A. I won't say that. I will say the disease organism is there.

Q. And it floats in the still air of the incubating chamber?

A. It might to a slight extent. It is possible to increase the humidity until it does not——

Q. As a matter of fact, Doctor——

Mr. Toulmin, Jr.: Let him finish his answer.

Q. You know it does, do you not? You know it floats in the air of the incubator?

A. I don't know the extent to which the air moves in all incubators, or any incubator to which you may refer.

Q. I am referring to the still air incubator of the type

in which there are no fans. Now, that germ is light enough, and floats in the air of that chamber, does it not?

[fol. 212] A. If it does, it is to a very slight extent, because we always find it gathered underneath the hatching tray. It drops by gravity.

Q. As a matter of fact, does it not float in the air in the incubator room, and will it not float from one incubating cabinet over to another and infect chicks in another incubating cabinet?

A. I have no knowledge of that.

Q. You never heard of that?

A. No.

Q. How high a rate of humidity would you put, at hatching time, in both types of machine, in the still air type and in the forced draft type?

A. I would like to have a relative humidity of between sixty and sixty-five per cent.

Q. In which machine?

A. At hatching time, for any egg.

Q. In either machine?

A. Yes.

Q. So it does not make any difference what type machine you have, the humidity should be raised at hatching time?

A. Yes.

Mr. Ely: I think that is all.

Redirect examination.

By Mr. Toulmin, Jr.:

Q. Dr. Hutt, I overlooked asking you one question that I should have asked you on direct—there are so many details, your Honor. Do you recall Mr. Taggart here stated that there was such a thing as a placenta in an egg? Is there such a thing in an egg?

A. There is not.

Q. Is that found in the human body and during the process of gestation?

A. In all mam-als.

Q. But not in an egg?

A. No.

Mr. Toulmin, Jr.: That is all.

Mr. Ely: That is all.

This concluded the testimony of the witness Frederick Bruce Hutt.

[fol. 213] JOSEPH INSKIP TAGGART, recalled as a witness on behalf of Plaintiff, testified as follows:

Cross-examination.

By Mr. Toulmin, Jr.:

In connection with the Smith patent in suit, it teaches the placing of eggs in the incubator cabinet, in which they remain for their entire period of 21 days. And during the period of 21 days, according to the plan given, the eggs increase in heat as the age of the egg progresses. During the period as shown on this chart, Exhibit No. 3, after the 17½ day area indicating the quantity of heat given off by the eggs during the remaining period of its life before it hatches, which has preceded that deadline of 17½ days is greater. I haven't figured up to see just what it is. It is greater. I don't know just what it is. In this incubator of Dr. Smith's, shown in his patent in suit, the plan is to have in the incubator eggs of different ages, some of which are quite cool as they are put in, and others of which are a little warmer, and so on, until you get to the period of maximum heat during the last three or three and one-half days. In the preferred plan given here there are supposed to be eggs in several different stages of incubation. I wouldn't say in all stages of incubation, I would say several. If you set three times during the hatch, there are only three stages. If you set every three and one-half days, you would have six stages.

Referring to all days of the life of the egg up to hatching time; you have all days in the incubator at the same time, [fol. 214] and those eggs are put in there in different groups according to your convenience. And the eggs are, therefore, in there, of different ages as I have referred to it in my direct examination.

I am asked as to that age which extends from the period of 17½ or 18 days to the 21st day, and if during that period, the heat given off from those particular eggs has a material influence or effect upon the temperature of the rest of the eggs and upon the air which is passing over the eggs. That

heat is utilized in the process of keeping the rest of the incubator warm.

As to what proportion of the total heat those eggs give off in proportion to the remainder of the heat from the eggs in the earlier stages prior to the 17½ days; what percentage can be had there to take over, I would say that more than 50 percent. of the heat is developed during the last three days, but I can't give you the exact percentage. With this 50 percent. of the heat that is given off in the last three days, Dr. Smith, according to the teachings of his patent in suit, utilizes it, to help keep the temperature of the air up to incubating temperature. It is utilized in helping in warming the incubator air and also in warming the eggs that are absorbing heat.

Now, with reference to the defendants' machine, of which we have a sample drawing here produced by me, Exhibit No. 15.

With reference to that machine, the eggs for the last several days, from the 17½ days; are customarily not placed [fol. 215] in that machine. Now, assuming that to be the fact, the eggs are out of the machine, assuming that to be the fact, that they are out of that machine, those eggs for the last three or three and one-half days, which are out of the machine before me, the eggs are not used in any way in connection with the incubation of the eggs that are in the machine. Those eggs, for the last three or three and one-half days, are put over in an entirely different machine. Any heat of these eggs that are put over in the separate machine, the so-called hatcher of James, is not used in any way to influence the incubation of the other eggs in the first 17½ days. After they are taken out of this machine, they have no influence on this machine at all. Coming back to the Smith patent, as the patent itself describes it, there is no mention made of moisture conditions at the last three and one-half days any more than any other time.

In the beginning of 1928, we came out with recommendations advising them to increase the moisture on the last three days, or during the time the chicks were actually emerging from the shell; that is, for a period of twelve or 24 to 36 hours. But at that same time we also came out with very definite instructions to increase the moisture content in the entire machine very much higher than we had ever used it during hatching time before that. That is,

prior to 1928 we had no definite instructions on the Smith machine as to the humidity conditions, and any humidity recommendations that we did make called for a smaller amount of humidity even at hatching time than we later recommended for the entire period, and at that time we [fol. 216] gave out recommendation that you would operate with a wet bulb reading of 84 to 85, except at the time when the chicks were actually emerging from the shell, at which time you would increase it to 88 to 90 with bulb reading. We have not recommended to carry it as high as 92. Dr. Smith always considered it advisable to have moisture, but the quantity of moisture was not considered important to the extent that it is now, and I could never find text books or any recommendation by an incubator manufacturing Company to carry the humidity at anything like as high as I am now recommending, until after the summer of 1928.

Prior to the time Dr. Smith made his discovery, the moisture problem was recognized because they knew that, if they put too much ventilation through their incubators, that the eggs would dry down too rapidly. At that time they had no adequate means of checking their humidity. The only gauge that they used was to check the air cell. They would test the eggs from time to time and see how much the air cell had devloped in the eggs, to see how much they had evaporated; and I don't know of any text book or anything of that kind that would tell you the exact percentage of moisture that is desirable for hatching in the old type machines. The hygromoters that they used were not accurate for still air machines, and there are very few of them, within reason, that are accurate today for a still air machine; and they were confronted with the problem—they talked about the problem, they knew they must not dry them down too much, but as we were operating prior to [fol. 217] 1928, we were not drying them down any more than we did in the still air machine, but in the present machine, operating as I told you here a while ago, we do not begin to dry them down as much as we did in the still air machines. 100 years ago, they knew that they had to conserve moisture. They knew, that if they put too much fresh air through the machines, they would dry the eggs down too much, and the problem was to have a forced draft and at the same time not take in too much ventilation, so that they would not dry the eggs down too much. At that period

they did not know the point to which it was most satisfactory to dry them.

That was 15 years ago. At to what I was referring to, 100 years ago, they were hatching 100 years ago. At that time it was necessary to control the ventilation in order to prevent too rapid drying to conserve moisture. That was the problem that confronted Dr. Smith.

So that prior to Dr. Smith, we did have the problem of conserving moisture, and the effort was made prior to Dr. Smith, to conserve it by regulating the amount of air that would dry out the eggs. I am asked what did Dr. Smith have in his patent that I think represented an advance over what I have already said was known as of 1916 or 1915? Simply restricting the ventilation, which was not necessarily an advance, but combining forced draft and staged incubation was an advance. So you have to have these special things I mention, plus anything else the patent may call for, in order to make up the combination of the advance.

As to what Dr. Smith from my point of view has done. [fol. 218] He combined staged incubation, arranging the eggs at different levels, and arranging them in columns, and applying to them a forced circulation of air of sufficient velocity to keep the temperature substantially uniform throughout the chamber. Restricting the openings, regulating the ventilation, was the necessary part of it.

Q. Would you agree that he had a method of hatching eggs by arranging eggs in the column and applying heated air forced about the eggs, the heated air being adapted to the eggs in various stages of incubation, as a method representing his invention?

A. Well, I am not going to answer that without having a chance to study the different points that you have raised there.

Mr. Toulmin, Jr.: Just read the question to him please, Mr. Reporter.

(Question read.)

A. Does that state he had eggs in different stages of incubation?

Mr. Toulmin, Jr.: Read it again, Mr. Reporter. I think it is entirely plain.

(Question read as follows):

"Q. Would you agree that he had a method of hatching eggs by arranging eggs in the column and applying heated air forced about the eggs, the heated air being adapted to the eggs in various stages of incubation, as a method representing his invention?").

[fol. 219] A. If it is definitely in there he had the eggs in different stages of incubation, and also that that air was adapted not only by temperature, but by moisture, I would say, yes.

Q. Would you agree that Dr. Smith had this method: a method of hatching eggs by arranging eggs in a column and applying heated air impelled about the eggs, the heated air being adapted to the eggs in the various stages of incubation?

A. If it is adapted by means of both temperature and moisture, and if the draft is of sufficient velocity to keep the temperature substantially uniform, I would say yes.

Q. And will you please answer whether this is a method of Dr. Smith, as set forth in his patent, as you understand it: a method of hatching eggs by arranging the eggs in a column of various stages of incubation, and applying heated air impelled about the eggs, the heated air being adapted to the eggs in various stages in incubation?

A. There is one factor that is being left out in each of those. There is one factor that is not set clear, and that is——

Q. Will you please answer the question, yes or no, and then explain?

A. I can't do it.

Q. Well, I ask that you answer it, yes or no, whether it is or is not, and then explain why or why not?

A. There is one factor that is left out in each of those statements.

Q. Just a moment, I would like to have a yes or no answer.

Mr. Ely: I think the witness should have the right to answer——

The Court: The question is whether that comprehends [fol. 220] the whole idea, I suppose. Now, I think the witness can state whether it does or whether it does not.

Mr. Toulmin, Jr.: He can answer, yes or no, and then make any explanation he wishes.

A. It does not comprehend the whole matter because it does not bring out the fact that the air recirculated through the machine. That same explanation will apply to each of the foregoing questions along about the same line.

Q. Does Dr. Smith have a machine of this description: an incubator having a chamber with racks and trays for the eggs, and a power-driven fan to produce a flow of heated air through the racks and trays, the fan being arranged to force the air from the bottom of the chamber upwardly around the trays to the top thereof? Please answer yes or no, and then explain, if you wish.

A. It does not, unless you recirculate the air with sufficient velocity.

Q. Does Dr. Smith have a method of this kind: a method of hatching eggs by arranging the eggs in various stages of incubation in a column, the eggs in different stages of incubation being in different levels, and applying heated air driven at a predetermined speed about the eggs, whereby the heated air will be adapted to the eggs in various stages of incubation? Please answer, yes or no, and then explain, if you care to.

A. It is not right, unless you recirculate the air so that you are using the same air over and over again.

Q. Does Dr. Smith have this method in his patent: a [fol. 221] method of hatching a plurality of eggs in different stages of incubation by subjecting all of said eggs to heated air and by supplementing the natural draft of the heated air with a forced draft to increase the velocity of heated air about the eggs, without changing the temperature of heated air, whereby the units of heat will be carried from the eggs in the more advanced stage of incubation to those in the less advanced stage? Please answer yes or no; then explain, if you wish.

A. It is too long a problem; I am not going to answer definitely without having some time to study it. I think that is substantially correct, but there might be some slight changes that are necessary.

Q. I will have the reporter read it to you, then you can study it.

A. If you will bring it to me and let me study it——

Q. Well, if you are willing to adopt that,—I want to be perfectly fair; is it substantially correct, Mr. Taggart?

A. I think it is, but I can't answer a question of that kind

without having a chance to study it. That is too important a question.

The Court: I think it was a long question and involves quite a number of points in the patent; and I think he ought to have an opportunity to study it.

Mr. Toulmin, Jr.: I am perfectly willing to give him all the time he pleases.

The Court: Do you mean by your inquiry, that that may not be all of the teaching, but that those are certain teachings of the Smith patent?

[fol. 222] Mr. Toulman, Jr.: Yes, sir, that is the complete method; I want to know if that is a method that this witness will adopt as being the method of this patent, so that we can define this patent.

The Court: That is a construction of the patent. I think he ought to have an opportunity to see just what the question is.

Mr. Ely: I have not objected to this course of examination because, apparently, that is nothing that is in the patent at the present time, your Honor.

The Court: Well, it may have a bearing. I think examination on the different stages of the patent is perfectly proper, but I think the witness should have an opportunity to understand thoroughly just what the inquiry is. Perhaps if the stenographer reads it again, you may state whether that is the teaching; or as counsel suggests, if it is not, you may add anything further you want, any explanation.

Mr. Toulmin, Jr.: That is why I suggested that he have the opportunity. I want to be perfectly fair.

The Court: It is quite a long question. He should have an opportunity to thoroughly understand its bearing. Perhaps the stenographer will read it again or you can have the printed question; you may direct his attention to it in that way.

Mr. Toulmin, Jr.: I will have to take it out of my notes.

Mr. Ely: May I have that question?

[fol. 223] Mr. Toulmin, Jr.: I would like to have the witness answer this now, now, without any advice from the arguments of Counsel.

Mr. Ely: I want to know where you got the language.

Mr. Toulmin, Jr.: I got it out of my notes. That is sufficient for my purpose.

Q. Now, Mr. Witness, I will hand you this, and you can have the reporter read back my question to you to be sure there is no slip in my dictation.

(Question read as follows:

"Q. Does Mr. Smith have this method in his patent: a patent of hatching a plurality of eggs in different stages of incubation by subjecting *by* all of said eggs to heated air and by supplementing the natural draft of the heated air with a forced draft to increase the velocity of heated air about the eggs, without changing the temperature of heated air, whereby the units of heat will be carried from the eggs in the more advanced stage of incubation to those in the less advanced stage? Please answer yes or no; then explain, if you wish.")

A. No, because there is nothing in here that indicates that the air must be recirculated. From what is given here, the air might all pass through the incubator once and then out. There is no indication that the air has to be recirculated, because there is no suggestion of restricted openings [fol. 224] to take in just a limited amount of fresh air.

Q. What would you add to that to make it Dr. Smith's invention, from your point of view?

A. You are asking a question that is not decided even by the Patent Office in two or three minutes, and I do not care to be bound by a simple statement of that kind. It is my understanding that you people charged several hundred dollars to get up a claim and I do not think I should be called upon to tell you definitely just what should be added to this to make it cover the patent; but if you add to this the recycling currents of air, or something that compels the air to recycle through the machine, so that you have the entire machine substantially at the same temperature, then I think it would be all right.

Q. And you do not read that into that language?

A. There is nothing in here to state that this air that passes through there would be recycled. It states "supplementing natural draft of heated air with a forced draft to increase its velocity". It does not say anything about whether it passes out of the incubator, as soon as it is

passed through the eggs, or whether it has to recycle or recirculate back through the machine.

Q. Is that all?

A. Yes, sir.

Q. Thank you very much. Now, in connection with this method of the Smith patent, I call your attention to the operating instructions for the steam-heated Smith incubator, a copy of which was produced here in Court by your Counsel when we exchanged copies of the public agents of [fol. 225] the respective parties; and I particularly call your attention to this language and then I will hand you the catalog so you can see it for yourself:

"The machine is so designed that the proper conditions are provided for the eggs in each stage of incubation. This is accomplished by setting fresh eggs at the top of the ma-machine and moving them down as the hatch progresses. In this way, the eggs in the advanced stages of incubation are near the bottom of the machine where the temperature and ventilation are most favorable for the hatching eggs."

Will you state whether this is a correct description of the machine made and operated under the patent in suit? I will hand you this.

A. That is a correct statement of the description of the machine. It was written by one of our men.

Q. Mr. Toulmin, Jr., shows operating instructions to the witness.)

A. That is correct.

Q. And what eggs are you referring to as the hatching eggs in that description?

A. The eggs that are placed in the hatching rack when it is no longer necessary to turn them.

Q. And what age are those eggs?

A. Those are in the 19th, 20th and 21st days.

Q. And what are the conditions of temperature and ventilation that are most favorable for the hatching eggs referred to in that description.

A. The temperature of the incubator.

Q. Well, what is that temperature.

A. Our operating temperature is 99.

[fol. 226] Q. And what is the humidity?

A. The humidity, wet bulb reading, is 84 to 85, except at the time the chicks are actually coming out of the shell, at which time we increase it to 88 to 90.

Q. And you will find in that instruction book in your hand the description of carrying the humidity and carrying the particular temperature we have mentioned, will you not?

A. Yes, sir.

The witness then resumed as follows:

I don't remember anything about stating in my direct examination that in this Smith machine we use coils or pipes through which cold water flows for the purpose of refrigeration or balance, but in this particular machine we do circulate cold water for cooling at certain periods in the hatch. We circulate the cold water for cooling whenever the temperature of the incubator runs too high. The factors that make the temperature too high are the out-side temperature and the manner in which the operator is handling it and the heat that is developed by the mass of eggs. And that heat will be developed in increasing degree as the eggs get older until the chicks begin to pip. After they begin to pip and begin to roll out of the shell, then the evaporation from their body has cooling effect and the heating problem is not as pronounced after they have pipped as it is just before they have pipped the shell. As to how many hours we use the cold water coils to balance the incubator, there are some operators that do not use them at all. It is my recommendation at the present time that, if you have full heat at a certain [fol. 227] time during the hatch and along about the 19th to the 20th day, that they turn on a little cold water and then allow the control equipment to furnish the necessary heat, and that keeps it at the exact temperature, easier than it is to let the temperature creep away from you a little bit and then turn it on; but some people do not use cold water at all. We may use it any time. I would say it is just as important to use it when there were no chicks coming on as it is in other times, but it is more commonly used during the hatching period. The problem is not so great after the chicks begin to roll out in good shape as it is before that. My attention is called to page two of this instruction book, and particularly the language, "A

cooling coil is provided for use on hot days or to counteract heat given off by chicks at hatching time." That is correct.

I am asked as to where do I find, in the patent in suit, any teachings of the necessity of using cooling coils in order to regulate the interior conditions of the incubator. I don't remember that there is any shown in there. I don't think there is; there isn't anything said about it that I remember now. Yesterday, when we examined our Smith incubator and his Honor and the rest of us were over there in our building, on the back of the Smith incubator was a large cabinet that had an air intake opening, and from that large metal cabinet a pipe ran up the back of the incubator, and thence across the top and communicated with the air inlet openings, or openings in the top of the incubator.

On that particular one, the only thing in the large metal [fol. 228] box that stood behind the incubator is a water spray, and there is a baffle in there, or water eliminator, which will take the extra humidity out of the air. That particular device is not on this machine down here. This is an electrically heated machine, and that description there was for a steam heating equipment that we were using at the time that catalog or instruction book was put out.

That one that was there was to humidify the incoming air, to raise the humidity of it, and in our present device we only have a spray in there that we turn on for hot dry days to cool the incoming air. It is a conditioning cabinet for preparing the air before it enters the machine, to take care of certain conditions.

I would not say it is a necessity to supply some additional preconditioned moisture before the fresh air goes into the cabinet; it makes it easier to do it. It makes it easier for the average operator if he can condition his air that enters the machine so that he has a uniform air condition.

That is due to your varying atmospheric condition. We operated for ten or twelve years before we had that type of device.

That particular device that you show there was intended to be used in all climates, all the year around, and the one I am referring to, on the electric machine down there in the storeroom is used only for hot days, not necessarily dry weather, it is just hot days. We have a damper on that intake opening in that steel box. We have a spray

nozzle there; the water spray is only turned on and advisable under certain condition. When we are using it, we use [fol. 229] the water spray. There is not anything of the kind taught there in the patent. You do not find any system of pipe running across the top of the incubator, shown in the Smith patent, such as shown on that piece of apparatus of Smith that we saw yesterday. I mean the duct across the top.

May I make a correction? On Fig. 3 of the patent it shows one intake opening at the center of the machine, and then there is a chamber that goes over to the valved slide above each fan, but we have never considered that as a part of the patent, and this device that we have down here is a new addition. This apparatus I have just mentioned is only the inside cabinet.

Referring to the straps 28 that are located at the bottom of the tilting stacks of trays, is the patent it states that those straps 28 can preferably be used—they are part of a preferable arrangement, the purpose of them being to force the air that has passed under the curtain, to pass through the two lower trays before it can get over into the air column; placed between the trays or between the columns of trays.

By the Court:

Q. I do not understand that answer. I thought those straps there had something to do with the control of the different tiers of eggs.

A. No, sir. Those straps, as indicated there, consisted of a strip of cloth that was fastened to one side of the rack and then down and fastened to the other side of the adjoining rack, so that the air coming from the corridor would be forced to pass through the bottom two trays on [fol. 230] the turning rack rather than passing out the air column between the trays, tray columns.

Q. Is that shown on this machine here?

A. That is not shown on the machine, and in actual experience, in placing columns closer together, it is found that they are not necessary. The Patent states that that is a preferable arrangement.

The witness then resumed under cross examination by Mr. Toulmin, Jr.:

The patent states at the bottom of the first column, page 2, "as heretofore referred to, and as the eggs further advanced in incubation are contained in those lower trays, and as the danger is that the temperature will rise in those eggs to a point injurious to incubation, the improved method disclosed herein permits circulating air to act as a medium to prevent overheating at this stage of incubation."

In the machine that we saw yesterday, of Dr. Smith, in our store-room, that machine had none of the top horizontal trays.

Those horizontal trays are shown and described in the preferred apparatus of the Smith Patent. As to where I find, in the Smith Patent, any teaching about turbulence that I have referred to from time to time on direct examination, the patent describes a draft of air of sufficient velocity to do certain work; and from experience, I know that you cannot have a draft of sufficient velocity to do this work without it becoming turbulent when it passes through the obstructions that it has to.

The patent speaks of a forced draft of air and currents of air, and any current of air moving under the conditions [fol. 231] that it has to move here must be a turbulent air, —turbulent current, if it has sufficient velocity to do that work.

The patent itself does not say "turbulence" but it does say "forced draft of sufficient velocity".

There is no word "turbulence", that I know of, in here.

As to where I find a teaching in this patent of setting the eggs in any other arrangement than that which is described in the patent of placing the cool eggs at the top, and as they become warmer, moving them down, step by step, there is nothing explained here. The preferred apparatus describes it that way, and there is no other way described. The preferred apparatus describes the method as has been stated, but it also states that it is obvious that the fans can be so arranged and can be operated at such a speed as to cause the hot air to circulate enough to keep the temperature throughout the chamber between the limits of 100 and 105. That is all that I can call to mind right now.

As to where I find any teaching in this patent of so-called sandwiching of eggs, that is, interleaving or staggering them, according to age, such as the method that I have

described the James Company have used, and which I have illustrated, the bottom series of figures in our Exhibit No. 27, the preferred apparatus as described in here does not describe an arrangement of that kind.

The patent does not show any means of restricting the outlet or outlets 28; that is, there are no dampers or slides, [fol. 232] or any other means by which the size of the openings 28 can be changed. There is nothing given as to the exact size of them either, and there is no means shown of restricting them. I am asked if it is not true that in this Smith Patent that I have before me, you are constantly adding fresh air and constantly discharging air; that is, you are constantly taking in air through the inlet port 24 and constantly discharging air through the outlet ports 28, and my reply is:

Unless the inlet is completely closed, that is the case. It states that 24 is a valve. It does not say whether it can be completely closed or not, or it does not say that it cannot.

Assuming first, that it is open, you are constantly taking in fresh air and constantly discharging foul air or used air. If the inlet 24 is closed, as I have suggested, then there would be no discharge of foul air because you are taking in no fresh air, unless there would happen to be some back current through one of the 28's and out of the other, which could happen. It is not the intention of it.

The action of the fan forces the air—starts the air on its way, and the construction of the machine makes it follow certain paths and any part of it that happened to reach the hole and pass out would be purely a matter of chance; that is, the part that happened to go out, the particular part.

The power for forcing the air from the fan 18 down to the bottom, and around and up through the egg column, and whatever part of it goes out 28, that power is the fan. The [fol. 233] air, being light and not swift has to be moved by pressure set up by the fan.

As to whether you push the air and compress it sufficiently, in order to get it to move down to the bottom and turn and go out through the opening 28, a fan has just as much suction power on one side of it as it has pressure on the other.

Being asked whether on the outlet side, pressure is the force set up by the fan on the air that forces the air down to the bottom, and turns it and causes it to go up to the top

of the egg column, where a part of it may go out 28 and the other part may blow over the barrier 22, through the fact that the so-called pressure has no more effect in here on the movement of the air then the suction has, the witness replied that pressure and suction cause the air to move. As to whether pressure alone would do it, this type of fan is very inefficient for creating pressure, and it could be pressure that starts it, but it is the cycle movement and the whirling action of the blade, as a propelling action; it is the propeller.

If you are talking about static pressure, that is one thing. This is a propelling or a forcing action. Now, your term "pressure" might apply here and it might not, but it is a forcing action. The propeller blades throw the air down and pull in a corresponding amount of air on the opposite side. You cannot throw any down unless a like amount comes in on the opposite side.

On that assumption, it is true that the fan 18, after the air passes by the fan, and as it passes by, is given an im- [fol. 234] petus, a force, by the fan, which drives it down around and up through the egg column, as described in this patent, the fan starts it down, and also the pulling force on the other side helps to bring it up through the egg column.

A certain amount of air would go out through the opening 28 because of the difference in temperature, the temperature inside being 99.

A certain amount of air will go out there regardless of the fact that this is not a convection machine. It will go out there by temperature; there is no question about that. The rest of it will go out by reason of the fan pressing it. The incoming air is sucked in through the opening 24 behind the fan. A portion of the returned air is sucked in behind the fan, over the barrier 22.

Asked as to whether there is a pressure condition in the egg column in order to get the air to move in two paths, one part of it out of the machine against atmospheric pressure, and the other part back into and back of the fan, the witness said: I will not agree that the pressures in the egg columns are greater than atmospheric pressure to any extent. The friction of the air going over the top of 22 causes air to be drawn in at 24. It creates a pull there and causes some extra air to come in through 24. 22 is the

beam on each side of the fan compartment. It is shown in Fig. 1.

The Court: Well, I was looking at Fig. 3. It is not shown there at all.

[fol. 235] Mr. Toulmin, Jr.: Yes, sir, you can see it behind the pipes. Shall I point it out?

The Court: It is not numbered.

Mr. Toulmin, Jr.: No, it is not numbered. It is just a board that runs across.

The Witness: In matters of actual construction, if we do not want to reconstruct the openings—if we do not want to valve the openings, or make them adjustable, we regulate the space between 22 and the ceiling so as to make that space small or large, and by so doing, we control the amount of fresh air that the machine will take in.

Whether I ever tested out the condition of the air in our egg columns to determine whether that air is under pressure or under suction, I don't know how to make a test that would mean a great deal. I have not tested it with an instrument of that kind. I do know this, that it is not possible to have any marked difference in atmospheric pressure inside that machine from the outside.

Referring to Plaintiff's Exhibit No. 11, I recall standing inside of the Smith incubator in our demonstration yesterday, and placing an anemomoter about the fourth tray up from the bottom of the tilting trays on one side of the machine, and then closing the curtain and viewing the anemometer about the fourth tray up from the bottom, of the tilting trays on one side of the machine, and then closing the curtain and viewing the anemometer through the isinglass window in the curtain while the machine was running. [fol. 236] What the reading was that I took yesterday, and Dr. Greene took at the same time, I don't remember. It seemed to me it was about 70 feet per minute, 65 or 70. Whether it was 60, I am not really sure. That is my impression of it.

Whether on this chart of mine, Plaintiff's Exhibit 11-a, I have marked about the point where that anemometer was located the numeral 60, it was farther back than that; and furthermore, this is diagramatic. In one column it might be 60, in another column it might be 70, or in another column it might be 100.

So far as vertical location is concerned, I think the anemometer was located on the tray below that 60, but it is about the right place, but it is farther back from the curtain.

I would say it was about two-thirds of the way back. It was as far back as I could reach in with my arm.

Yesterday we found from 60 to 70 feet per minute as the air flow on the Smith incubator at that point. The incubator that we saw yesterday, with the exception of the single demonstration tray of china eggs, had no eggs in it. This 60 to 70 feet per minute was taken with no eggs in the machine except those few.

When I made these tests which resulted in Exhibits Nos. 11-a, 11-b, and 11-c, the Smith incubator was filled with eggs. That was a 52,000 egg machine.

Whether it was completely filled, I think there was one setting—the tests were made at different times. There were certain times when there was one set of 7,000 eggs not in there.

These readings were taken a year ago or more, in your [fol. 237] absence, and they were taken in a machine that was in regular operating condition, full of eggs. Understand that there are certain days in there when there are 7,000 eggs more in them than there are on other days. I can't give you the exact number. I don't know whether it was six full settings, or five full settings, or seven full settings. It would depend on the particular day the tests were made. The tests represent a study of several days, and on hatching day it has seven or eight thousand more eggs in there than it has on other days. The variation in eggs, in number, which I do not recall exactly, would range between 45,000 and 52,000.

As to how many eggs between those figures were in the Smith incubator when I made the tests which I have brought in here to show the Court in Exhibit 11, it was operating in its regular manner, full, and I don't know whether they were all made on hatching day, or whether any of them were made on hatching day.

Q. How can you tell me it was full when you just told me you did not know whether it had forty-five thousand or fifty-two thousand? That is a big difference.

A. In the regular operation of the machine, it will vary between those points, and I can't tell you whether it had the maximum number or minimum number.

Q. Very well. Now, will you turn and tell the Court whether, having eggs in the Smith Incubator, filled or partially filled, as you have described, it would have any influence upon the rapidity of the passage of air through that incubator in making the circuit?

A. Yes, it influenced it. The mass of eggs would take [fol. 238] up perhaps fifteen per cent. of the cubic contents of the air there. That is, the mass of eggs would occupy about 100 cubic feet, which would be about one-eighth—a little less—of the total cubic contents of the machine. That would have a material bearing upon the speed at which the air was traveling, given a constant full or empty condition.

As to what I figure to be the cross-sectional area of the James Egg chamber, the defendant's machine, the cross section dimensions of the entire egg chamber from wall to wall. I don't think the figures are here. As I remember, the tray is 27 inches square. I don't have that right here. The space occupied in the egg chamber by the number of eggs that James carries in the egg chamber when the egg chamber is filled, is approximately eight and one-half cubic feet. The cubic feet of the chamber itself is approximately 39 cubic feet, or 30 feet—it is in that figure—and the working parts occupy a certain space. I have forgotten what it is.

Prior to 1915, farmers who had incubators of the single tray type may have repeatedly put eggs of different ages, different stages of incubation, in the same tray, in the same incubator, and subjected those eggs to conditions of heat, moisture, ventilation and exit of foul air.

I know it was not the practice: it was not the custom, and it was not the recommendation of the manufacturers at all. I do not deny that it was done. I have done it.

In our laboratory, in school, when we wanted to carry eggs only for eight or ten days, for section work and for investigation, we would keep adding eggs every day, to [fol. 239] the same machine. We never carried them through to hatching time when we were doing that. If we had carried them, they would have come off after 21 days, in successive groups, but they would not have hatched as well as if they had been conducted otherwise, because the conditions are not the same. You have to turn part of them and others you don't. It has been done. It is not recommended. They are not built for that purpose.

Those incubators had openings for fresh air and openings for the exit of foul air. They had heat applied to them. If the fresh air came in and the hot air went out there was some air circulation; it was convection current.

If you put eggs of different ages in the same tray, the heat of the old eggs would not be transmitted to the air, to go to the younger eggs. In a condition of that kind, the hot air would rise to the top of the incubator and out. There might be a slight diffusion due to the convection currents. If there was, it would happen.

In those incubators we had moisture. We regulated the moisture according to the age of the eggs that were being incubated. As to increasing the moisture during the last three or four days of the hatch, it was customary to keep the incubator closed after the chicks began to pip. One of the main reasons was to conserve moisture in there. We conserved moisture by regulating the air inlet or outlet openings, or both.

The use of air circulation of some sort, the use of fresh air and the use of letting out foul air, the use of moisture and the use of heat, were all elemental facts applied in incubation prior to 1915. The conservation of moisture by [fol. 240] regulating the ventilation openings was one of those things that a man did when he had an incubator prior to 1915.

I recall testifying about the Blue Hen incubator, a picture of which I produced, Plaintiff's Exhibit No. 7. That particular catalog was gotten out in 1922. It was representative of the mammoth incubators of that period, prior to 1915. In this Blue Hen construction we have a stack of incubators, one over the other, with only one tray in each incubator, in which eggs are placed, of different ages, an age to each compartment.

It is not a necessity that there are different ages in each incubator compartment, but that is the recommendation. To my knowledge, that was practiced.

When the top group of eggs was gotten along several days, they were moved and put into the next succeeding compartment below. That was continued until you got to the bottom cabinet or bottom incubator, as we call it. Each of these compartments had an air inlet, an air ventilation opening. Each compartment had moisture. Each compartment had heat from the common heating system.

Each compartment regulated the moisture by regulating the ventilation openings and by the size of the moisture pans within the compartment. As to how they regulated those moisture pans, I think they had different sizes. I am not sure whether they covered any of them or not. In some cases, they put sand in them; different devices to help more moisture evaporate.

The air inlet opening on that particular one was near the bottom. I don't know whether it was at the rear or [fol. 241] whether it was right on the underneath side. It might have been at the rear. I am not sure. I would have to see the cross-section. I cannot recall whether it was at the rear or bottom. It is natural that it is at the rear of that machine, judging from other features, but I am not sure of it.

Regarding the air inlet in the Blue Hen being at the rear, and in the James old style at the back, I am not sure on that particular point; I would have to check it. The air outlet openings are at the top. The air that is coming out of the top of the bottom incubator through the outlet opening would rise and go up against the bottom of the next succeeding cabinet above; it would go right out into the room. If there was an air inlet opening in that cabinet above, some of that hot air might go in there and pass into that egg chamber.

The James Company started out with the old sectional type of incubator, and they are today still selling those incubators, to my knowledge. They are using the sectional type as their hatcher; they are simply using the same machines in many cases.

The James hatcher consists of a box with air inlet and air outlet openings, with ventilation, a moisture pan or water pan, a suitable tray or trays, and the application of heat. That instrumentality, that structure, is the same structure that was used before by the James Company for both incubating and hatching for the entire 21-day period. Now they do not use it for the entire 21-day period, but only for the last three or three and one-half days.

This morning I produced a set of diagrams, Exhibit No. [fol. 242] 27. The diagrams of those manufacturers other than Smith and Buckeye represent a construction or constructions that have been held to be infringements of the Smith patent.

I have not produced here and shown the Court those constructions and egg arrangements held by the District Courts and Courts of Appeals as not being infringements of this Smith patent.

As to Exhibit No. 27, in the views of the James egg arrangement, at the bottom, the lowermost egg in each instance is not the oldest egg. In all the other constructions above this James layout, in each instance the bottom egg is red, but it does not necessarily follow that that would indicate the oldest egg. I have shown it on this drawing, it happens to be in this particular case, but that is not a requirement of the Buckeye.

Q. I am asking you as to what this drawing shows, now. We will come to that later. In the constructions other than the James incubator, diagrammatically, on Exhibit 27, do you find any instance of an incubator defendant, manufacturer defendant, using a separate hatcher, or were there constructions which you have illustrated thus in which the entire operation of 21 days was performed in the incubator?

A. The entire operation is performed in all of these with the exception of Buckeye.

Q. And that was not a question of infringement by contest in court?

A. No, it was not decided in court.

Q. So far as any contested litigation is concerned, purported to be illustrated by Exhibit 27, the question of separate hatching was not before the Court?

A. That is correct.

Referring to Exhibit 14, showing the defendant's ma-[fol.243] chine, I made my tests with the machine full of eggs on both sides. I also made it with the machine not full of eggs. These particular records are diagrammatic of the condition when full of eggs. These particular designations as to speeds on Exhibit 14 were taken when the incubator of James was full of eggs on both sides.

As to the comparative chart, Exhibit 11-a, b, and c, of Smith, I can not tell now whether the incubator on which I made those tests was full of eggs; I can't say whether it had forty-five thousand or fifty-two thousand. It was operating in its regular manner. It would depend on the day on which the tests were made.

Referring to the chart marked on the motion for preliminary injunction as Defendants' Exhibit No. 19, the drawing in the left hand column looks very similar to the Petersime construction, which was the defendant's construction in the case of Smith vs. Petersime. I think I have seen this cut in the patent; I am not sure. In that Petersime construction the drum, or the circle which contains the trays, had eggs in, I think three different stages of incubation, or two different stages, and the hatching eggs—or the actual emerging from the shell took place in the top of the machine.

By the Court:

Q. What is the idea of having that circular construction; is it suspended there for something?

A. It is suspended at each end on the central shaft, and the paddle passed around that somewhat like the reel on a grain binder. It resembles that.

[fol. 244] Q. So it shifted?

A. That was for stirring the air. It passed around in that manner, and I think the other line, which is at the rear—it might be confusing—represented the belt that drove that.

Q. That would move around in the air in the chamber there?

A. Yes, sir, like the stirrer in an ice cream freezer.

The Witness: That Petersime incubator consisted of a closed box with air inlet and air openings, one or more of which was controlled by a slide. The incubator had moisture in it. The Court did not hold that it had air currents in it. The Court held it had an agitation of air or a mixing of the air as distinct from definite currents; at least, that is my recollection. The Petersime machine, in the left-hand column of Defendants' Exhibit 19 on the injunction motion, which Exhibit is before me, had in it a stirrer consisting of one or more flat boards or blades that were carried around in a circle by arms, in order to engage with the air.

Q. And when that stirrer and its blades did engage with the air, it would first push it on the one side, and pull the air on the other side, and then the air would slip off tangentially from the ends of the boards or sides of the boards?

A. I don't believe that is the way you explained it before to the Court.

The Court: He is asking if that is the way the structure operated.

The Witness: It does have an action similar to that but the Court did not interpret it that way.

[fol. 245] Q. I am not asking you——

The Court: He is asking your description of the construction.

Q. You are an engineer.

A. There is a narrow space between the drum and side wall, and as the paddle would pass through there, it would create an air movement and would stir the air in no uncertain terms.

Q. And that paddle turned around about how fast?

A. If I remember correctly, it would be 200 or 210 r.p.m.

Q. That is correct; about the same speed as this turbulator or air stirrer in the James machine, is that correct?

A. Yes, sir.

In this turbulator or stirrer of the James machine as that is rotated, the air is engaged by the arms of the stirrer so as to press that air in front and draw it from behind, and the air will fly off centrifugally as the stirrer rotates, just the same as a centrifugal fan. I don't think I would say that the operation of the Petersime arms or blades was just the same as the turbulator or stirrer of the James machine. The structures are entirely different. As to the air in the Petersime flying off tangentially from the blades of the stirrer, or centrifugally, the blade, as I remember it, is about an inch and five-eighths wide, and it is not in the shape of a paddle at all. It is a strip that runs lengthwise along the drum.

Referring to the upper or moving means in the James machines, it consists of a flat disk with some vertical flat fingers or arms sticking out from the periphery of the disk. This [fol. 246] disk with the arms rotates about a vertical axis. When it does so, these flat blades engage the air and the air is thrown out centrifugally from the center. It first pushes the air and as a result of the pushing, the air flies out centrifugally along the face of the blade. That will inevitably tend to create a slight suction behind the blade, due to the fact that the blade is moving faster in the air than the air

can catch up with it. That is true of all blades of that type, and of this flat-bladed type.

Turning to the second illustration, reading from the left, on Defendants' Exhibit 19, on the injunction motion, and with reference to being familiar with the construction of the so-called Bundy incubator which was the incubator of the Blum suit, I am familiar with the present Bundy incubator. That drawing does not represent the present Bundy incubator that I am familiar with.

I understand how that particular Bundy incubator operates, as illustrated there on Exhibit 19. This particular machine contained stacks of egg trays, and through the center of the machine was a central shaft on which were mounted boards approximately four foot long, if I remember correctly, they were mounted one board—a stack and a board, and a stack and a board, as shown on the top of the page, and the shaft had a pulley at the end of it, and the boards were rotated slowly in the machine.

By the Court:

Q. Well, you mean, by the boards that rotate—you do not mean between the layers?

A. Here we have stacks.

[fol. 247] Q. Yes, I see.

A. Of trays, and these boards were almost five inches wide.

Q. They are mounted on that shaft?

A. They are mounted on that shaft, at the center.

Q. I thought you were referring to some boards between the trays, between the corridors.

A. That is the space in between.

Q. Those are the boards referred to?

A. Yes, sir.

Q. Mounted on the shaft?

A. Yes, sir. They were at different angles.

The Witness: In that incubator of Bundy, or Blum, there were stacks of trays having eggs of different ages of incubation. That same thing was true of Petersime. As to the order in which those eggs were arranged in the Blum case, the Bundy construction, I am not sure just how those were set up. I would have to look that up. The standard Petersime arrangement is that the trays are of different sizes,

and they have to put them in in a certain order to keep the drum balanced. They were sandwiched, but that can be varied to a certain extent. They are sandwiched just as we call the James here, this arrangement we have been talking about, of sandwiched eggs. The Petersime machine is still on the market. I think it is being sold as extensively as anybody can sell incubators nowadays. The catalog shown me indicates a Petersime commercial incubator. It is from the regular Petersime catalog. Counsel for defendants then offered the Petersime catalog as Defendants' Exhibit No. 28, for identification. It indicates their current commercial form. As to how this compares with the incubator that was in the litigation of Smith vs. Petersime, there are a number of new models and new improvements. This particular one [fol. 248] shown here, the hatching compartment has been changed to the bottom, and there are different sizes. It is a very much improved machine, and the hatching is in the bottom now instead of on the top. Aside from that, it is quite the same. They have put in certain partitions in places that did not exist at that time. I think it is substantially the same machine as in the litigation.

Looking at the construction which is the third from the left-hand side on Defendants' Exhibit 19, I am familiar with the Bolling Constructions that have been put out in more recent years, but there are none of these that represent the device that was before the Court in Indiana, in the suit of Smith and Buckeye v. Boling. I have read the record to verify that fact. That is my belief. There were no drawings or no physical exhibits introduced before the Court.

Referring to the last illustration on the right hand, on Defendants' Exhibit 19, I am familiar with the defendants' construction in the case of Smith v. Hillpot in the Third Circuit. This was the construction of an experimental machine; it illustrates the construction of an experimental machine that Mr. Hillpot had. There were other constructions. This particular machine illustrated in Exhibit 19, is identified as an experimental machine that he had not used for more than experimental purposes. That was one of the machines in issue in that suit. It was an experimental machine that he had there. I am not sure that he ever had it in full operation. He had trays on the sides of the corridor, and in the top of the corridor he had three fans arranged that would circulate the air, pull the air off the heating pipes

[fol. 249] above and circulate it down into the cabinet; but, so far as I know, this machine was not used for anything other than experimental purposes.

I am familiar with the defendant's construction, Hillpot construction, in that suit. I can make a sketch to illustrate that construction. In the Hillpot construction they had a cabinet about ten or twelve trays high, as I remember it; there were three trays in each stack, ten or twelve trays high. The trays were approximately square, and he had a central passageway or central corridor, but it was not a passageway that could be entered without taking the trays out, and in the side wall there was a fan set as shown, so that the edge of the fan came right with the wall of the incubator; that is, the tips of the fan blades were right at the wall of the incubator. This fan drew heated air from the compartment that was directly above the incubator, that had an ordinary house-heating radiator in it, and the air was drawn in over that fan, or over that radiator, and down a tunnel like or conduit to the point of the fan, and was forced out into the chamber. There was no curtain there at all. There was no return. The air escaped through various exhaust openings. The fan was mounted in the side wall in that manner. I mark the sketch with the letter "A" to indicate cabinet; the letter "B", the stacks of egg trays; the letter "C", the corridor; the letter "D", the fan; the letter "E", the conduit from the radiator leading to the fan. This was a vertical conduit that came over the radiator, overhead; that is "E". Thereupon counsel for defendants offered in evidence the sketch of Hill- [fol. 250] pot's construction, made by Mr. Taggart, and it was marked Defendants' Exhibit No. 29 for Identification.

The Witness: In the construction of Hillpot that has been illustrated on this Exhibit 19, at the right hand. Hillpot had this one experimental device that had a fan at the top. The heating pipes were just over the top of the fan.

I testified in the Hillpot case. There was there an exhibit in the case, that showed a construction such as Exhibit 19, in the extreme right hand column, which the defendant testified was his experimental machine and had not been used further than experimental purposes. There was a structure of this kind.

Referring to Exhibit 14, the James machine, I stated this morning that the air started with the air-moving instrumentality at the top—and then moved down through the side passageways where it entered a point below the egg compartment, and at that point met the cold air, and the air mixer, and then the air moved on upwardly, through the eggs, after having been engaged and mixed by the air mixer. The fan at the top is the impelling force that moves the air downward, and, of course air enters at the bottom with considerable force, and there is also the suction action of the fan to draw it up, so that the fan moves it in repeated cycles over and over.

Q. And whatever currents, if any, were broken up by the air mixer at the bottom, there would be no other fan or air mixer above that air mixer for creating any additional currents inside of the egg cabinet; that is correct, is it not?

A. Any that might be there would be very slight. The [fol. 251] motion of the fan, the pulling action, the forcing, which ever you want to take is what moves that up through there in a continuous stream.

Q. Now, Mr. Taggart, just one more question before we adjourn. You referred, in your direct examination, I think, yesterday, in response to a question of Mr. Ely, as to speed of air of some 11,000 feet a minute, which it was claimed I had referred to in my opening statement, either this time, or in the preliminary injunction motion.

Mr. Ely: The motion.

Q. Now, as to that 11,000 feet a minute proposition, did you understand me to refer to cubic feet or linear feet?

A. In your opening statement as it is recorded by the stenographer—I mean, in your statement before the Court at the motion for preliminary injunction, you were talking of velocity, and stated it was moving at 11,000 feet per minute, on two different occasions.

Q. Now, in that action, is it not a fact that, in the connection I was then using it, that Judge Westenhaver, in referring to the plaintiff's machine said this, and I will quote it as a basis for my question to you, to clear up this matter so it will not confuse the Court.

"The shaft is driven at a moderate rate of speed," referring to the defendant's construction first, "so that the

outward tips of the revolving boards move only at the rate of 2,000 feet a minute, whereas the outward tips of the fan blades of plaintiff's 18-inch fans revolve at the rate of more than 11,000 feet a minute."

Now, is it not a fact that if Judge Westenhaver was cor-
[fol. 252] rect, whom I was following, with your fan tips traveling at 11,000 feet a minute, that the air engaged by those tips would have a force applied to them equal to that speed of 11,000 feet? Whether it ever accomplished that would depend upon the slippage upon the face of the fan, and other matters. In other words, the linear speed referred to in the 11,000 feet was the fan tip speed and not the speed of course, the air could get up to, as that would be an absurdity, as it could not get that high, is that not correct?

A. That is not the correct statement you made here before the Court.

Q. Is not that a correct statement now?

A. Judge Westenhaver stated that the tips of the fan blades were moving at 11,000 feet, but you stated that the air was blown down from the fans at a speed of 11,000 feet per minute and continued at that velocity up to the egg chambers.

Q. Now, we will let the Court determine that later.

The Court: I believe that Counsel, in his subsequent statement, can clear that matter up.

Q. The second thing, Mr. Taggart, is this: in your machine, such as we saw at Grand Rapids, at the Incubator Convention this fall, when Dr. Greene who sits here, and myself, were present there talking to you, is it not a fact you advised Dr. Greene that your four fans in that incubator were timed at such speed as to deliver about 2,700 cu. ft. of air a minute per fan? If that is not correct, please
[fol. 253] correct me, so we can get the right figure?

A. No, the particular fans that were out there are rated at 2,100 cu. ft. per minute.

Q. Well, now, let us put it this way: if we want to find out how many cubic feet of air are delivered in a Smith incubator we take the reading of the fan such as you mentioned in your direct examination, which, in this case, you say was 2,100?

A. I think that is correct, yes, sir.

Q. Multiply that by the number of fans?

A. Yes, sir.

Q. So if you have five fans at 2,100 cu. ft. the total volume of air delivered would be five times 2,100, is that correct?

A. Yes, sir.

Q. And then we would get a total result which would approximate, say, a figure from 6,500 up to 11,000 cu. ft., per minute, is that correct?

A. Yes, sir.

Mr. Toulmin, Jr.: All right, that is all.

Redirect examination.

By Mr. Ely:

The fan delivered 2,100 cu. ft.

And we had two different machines on exhibit there, and they both had the same type of fans. One of them was a 39,000 egg machine having three fans, and one of them was a 65,000 egg machine, having five fans.

Our 65,000 egg machine is bigger than this machine that we saw down here at the warehouse. It is hardly correct to say that we had larger fans and more fan capacity than the machine down here. Since last July, we have been equipping some of our latest machines with this type of fan, a new type of fan. It is a split phase motor and is thought better for the general public, in general appli- [fol. 254] cations, that is. There are some places where the current is not proper, and this type of motor stands up better than the induction type of motor which we used to use.

We have different types of machines, but we also equip them with different motors, under different conditions. The type fans we have down here and the type fans on which I made my calculations were the type that were throwing 1,500 cu. ft. per minute. That is a standard machine which we have put on the market. We sold several hundred of them. It is only since last July that we have been putting this other fan in our incubators.

We have been increasing our fan capacity more recently. The first fans we had, of that kind, as a matter of fact, were shipped by the Robinson-Meyers Company, direct to the Exhibit. They did not come to our factory. As to our fan capacity, in our early history, the Smith incubator was

approximately the same. We have used several different types of fans. We have used perhaps five times as many as the type that is shown here as we have of any other variety. Two fans were shown in that machine of the patent. They are smaller, proportionately smaller, than the fans we use today.

Q. With regard to Exhibit No. 27 on the egg arrangements, Mr. Toulmin called attention to the fact that in these James Way arrangements, the blue or the endothermic eggs were at the bottom of the column, whereas he called attention to the fact that in these various other arrangements that you have shown, the exothermic eggs were [fol. 255] at the bottom of the column. Now, as a matter of fact, in these particular arrangements which you have chosen to show, in the first group it is a three and one-half day egg, in the second group it is a four and one-half day egg, in the third group it is a seven day egg, and in the fourth group it is a ten and one-quarter day egg. Now, those eggs are not moved, are they; that is, they are not shifted to any position in the column?

A. No, sir.

Q. So that those eggs will be exothermic eggs at some other time in the process, will they not?

A. Yes, sir.

It makes no difference, in a matter of heat transfer, whether these eggs that happen to be in the bottom layer are in their endothermic or in their exothermic stages. They would eventually become exothermic if you allow them to remain there another week. You could show an arrangement a week later where those eggs would be exothermic eggs. The James Way uses the heat that has been given off by eggs in the later stages of incubation, in the hatching process. The James Way does not use all of the heat of the exothermic eggs in his process. He does not take full advantage of the possibilities that exist there. He has used the process perhaps less efficiently than Smith. He still uses the heat of the exothermic eggs in bringing the endothermic eggs up to temperature. Although he does not use the entire volume of heat for that purpose. As to what effect the moisture content of the air in the incubator has with respect to the drying of the eggs and the conservation of the moisture within the egg, the more humid the [fol. 256] air is in the incubator, the less moisture will

evaporate from the egg itself, and the higher we keep the humidity in the machine, the less evaporation we have from the eggs. The matter of the control of evaporation of water within the eggs is not a factor in securing proper chicks only during the last three days of the incubation it is necesary to control it at all points.

It is necessary to control the evaporation of the water in the egg at all stages, because the size of the chick is determined—if you keep your high humidity and keep your temperature at the right point, you will have your chicks growing in a regular way. If, at an early stage, you do not have proper humidity and proper temperature, you can do very severe damage at that time. In fact, most of the cripples and deformed chicks, and so forth, it is the consensus of opinion that that is caused during the first week of incubation rather than the last week, and the humidity, the evaporation of the egg, and the temperature effect it then just the same as they do later. It is the general understanding that, after the eggs get to the point where they no longer need to be turned, that they will stand a lot more grief and rougher handling than they will at the earlier periods.

This matter of evaporation, in order to secure the best incubation results, should be an evenly distributed evaporation. I don't believe that the matter of conservation of moisture is any more important at any one time in the process than it is at another. This Smith process is a going process, not static in the sense of fixed. It has been subject to improvement right along.

[fol. 257] We have been learning about the incubation of chicks right straight along, it is a continuous study. We are continually improving upon this basic process. The basic process covered or disclosed in the Smith patent had not been changed. We have found, perhaps, improved ways of operating and improved devices for our machines. We have not changed the principle of this air circulation and heat transfer.

It is necessary in a going process to find improvement as you go along. If it is a live thing, it keeps being improved.

In a number of cases operators of the Smith incubator have carried on the practice of hatching the eggs up to the 18th day in the Smith machine, and then carrying on the remaining three days in some other machine. At Shenan-

doah, Iowa, there is a Smith operated there in which they take the eggs out on the 18th and 19th day and put them in another machine for hatching. There is another one along the Ohio River in southern Indiana—I cannot think of the name. I can point it out on the map, I cannot tell the name. There are operators who do that very thing with the Smith machine. As to the Smith machine adapting itself to that arrangement, there is no reason why they cannot do it.

Q. And in the Smith machine, do you know of any instances where they put the eggs in other positions than in the racks, or in the exact order in which it is described in this patent?

A. They sometimes get them in there wrong, but they have to move down—the chain arrangement compels them to move down progressively. Sometimes they will set as [fol. 258] many as four or five trays in one column at a given time, and then there has been Smith machines on the market—I will not say there were commercially sold, but they have been put out and used, as many as 15 or 16 of them, that I know of, in which there were racks, like Buckeye, and it was the custom in many of those not to move the machines—not to move the trays at all from the time they were set until they went into the hatching compartment.

I have known of a number of fresh trays to be put right on top of the hatching rack, and at certain periods placed in the hatching racks, in and I have known a Buckeye machine particularly, in which there would be many trays put in the corridor in different stages of incubation. They would change this order of arrangement of eggs with respect to the circuit of air.

Referring to Defendant's Exhibit No. 19, in the Petersime machine, the egg trays were in what is called a drum; the trays placed in the drum. The trays were different sizes so they would fit the drum. The thing which beats up the air had a central shaft which supported the trays, and on the shaft at both ends of the drum there was an arm pivoted at the center, and on the end of this arm there were two blades, or two pieces or strips of wood about one and five-eighths inches wide, if I remember correctly, that reach from one end of the drum to the other, and these were caused to rotate about the drum, somewhat similar to the reel on a grain binder.

It was held that there was not any definite movement of [fol. 259] the air in current form through the machine in the operation of the Petersime machine. The decision of the Court was that there was nothing in that machine to force the currents to move in any particular path. That thing that revolved around beat up the air and caused general agitation.

I recall that present Counsel for the defendant were Counsel in that case. I heard arguments in that case. I did not hear the argument made by defendant in that case that the Petersime machine had air moving in current form. They said that there was no current moving in there, that the air was simply stirred and beat up, and that it was decidedly distinct from the current form movement.

With respect to the Blum construction, illustrated in that second sketch, and with respect to those devices for agitating the air in that case being large boards, like paddles, as I remember, the boards were about four and one-half inches wide, or five inches wide. They were placed just flat on the shaft. That third device was not in the Blum case as an exhibit of the incubator in suit, at all, as I remember it. The incubator in suit the thing that was alleged to be an infringement, had perfectly flat blades, so that the face of the blade was parallel to the shaft. As it rotated on the axis the air was churned and beat up continuously. The Counsel took every oportunity to stress that there was no definite air movement in there, that it was simply an agitation or a mixing of the air. As to there being any recirculation of the air in definite closed cycles in that machine, there was none so established. Present Counsel for de- [fol. 260] fendant was counsel for Blum in that case, and I heard the argument in that case.

With respect to these drawings, illustrated here as Smith vs. Boling, in that suit there was no drawings of this description in the record at all. These drawings were taken from a brief that was submitted by Counsel, and the drawings were part of the illustrations that they used in a brief of a later case. They were argumentative drawings used for the purpose of argument by Counsel for the plaintiff. They were put in by Counsel for the plaintiff to illustrate some various constructions.

Mr. Ely: There was no opinion at all. The Court simply dismissed the bill for want of equity.

Mr. Toulmin, Jr.: The Indiana Court is accustomed to just give a decision without any opinion, in that court, and the entry is usually signed by the clerk, in ordinary custom.

The Court: Was that in the Circuit Court of Appeals?

Mr. Toulmin, Jr.: It did not go up to the Court of Appeals. The plaintiff, Buckeye-Smith, did not take any appeal in that case.

Mr. Ely.: I will explain that, your Honor while we are on that point, I might as well clear it up. Here is a quotation from page 116 of the Petersime record, which will show you just what that is, and this is the brief filed by plaintiff's counsel.

[fol. 261] The Court: On the appeal?

Mr. Ely: Yes, it is in the record.

The Court: Well, there was an appeal? I thought you said there was no decision.

The Witness: That was an entirely different case.

Mr. Ely: This was a brief filed by Counsel, not an opinion, your Honor.

The Court: I understand that, in the District Court, but this says "Pages 105 to 117, Circuit Court of Appeals record".

Mr. Ely: Well, the Circuit Court of Appeals record referred to is Circuit Court of Appeals record in the Petersime case where the brief filed by Counsel for the plaintiff was filed as an exhibit.

The Court: Yes, I see.

Mr. Ely: Now, in the brief—and I will show you where those drawings come from—in the brief for the plaintiff it says, "We attach here three sketches, and the one marked No. 1 must be conceded to be within the terms or spirit of Claims 1, 2, 3, 5".

The Court: Well, there is no proof that these particular drawings here were the drawings which the Court passed on in that case.

Mr. Ely: I object to this going in, your Honor, under the heading "Defendant's construction held not to infringe the Smith patent", and with this at the bottom of it, without explaining just what those drawings are.

The Court: I am inclined to think that that entirely [fol. 262] should be stricken out upon your own showing

here; it is only an illustrative drawing that was used in the case.

Mr. Toulmin, Jr.: May I be heard, your Honor?

The Court: Surely.

Mr. Toulmin, Jr.: Here is our situation that we have here: we have produced the record of testimony in the Bolling case, in Indiana. In that case there were no drawings that were filed that we could ever find. We made these three drawings, you see, in Smith vs. Boling, United States District Court of Indiana, and we were confronted with the same problem we had in the Petersime case; to illustrate what was done in the Boling case, we made up those drawings based upon the record as we interpreted the witnesses' testimony of their understanding of the construction in the Boling case. We had these three drawings in our Petersime brief; then when we came to this Court and tried to give an illustration of what happened, I called attention to the fact that these drawings were not from Smith vs. Boling as official drawings, because I did not want the Court to believe that, but I called attention to the fact that they did occur in the contested case between Smith and Buckeye and Petersime. No objection was raised then as to their accuracy. We have that record, your Honor, and it is that record—I ask you to reserve your decision for that purpose. Their probative value [fol. 263] would depend on how accurate they are, if you want to go into that case.

Mr. Ely: I wish to call your Honor's attention simply to the descriptive matter where the three drawings were put in by plaintiff's counsel in that case as illustrating, first, the construction which was covered in the patent and then their arguments, if this was patented construction, that ought to be included.

The Witness: These three drawings do not show the construction of the Boling incubator, which was in that Indiana case as described by the witnesses. There was no drawings or exhibits in that case. The Bolling construction was later held to be an infringement in that case in Idaho. That Boling construction was similar—at least the arrangement of eggs and the fans were similar to that shown in Exhibit No. 27.

(The Plaintiff thereupon rested.)

ARTHUR M. GREENE, JR., called as a witness on behalf of Defendants and sworn, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

Q. Your occupation, Dr. Greene?

A. I am an educator and mechanical engineer.

Q. Will you please state what is your present immediate [fol. 264] employment?

A. I am at present the dean of the School of Engineering, Princeton University, and professor of Mechanical Engineering.

Q. And how long have you been there?

A. I am now half through my twelfth year at Princeton. I preceded that by 15 years as professor of Mechanical Engineering at the Rensselaer Polytechnic Institute, coming to the Institute from the University of Missouri, at which place I was Professor of Mechanical Engineering; and during my last five years there I was Junior Dean of the School of Engineering.

Q. And your position at the second institution, what was that?

A. At the second institution?

Q. Yes, after Missouri.

A. At Troy, I was professor of Mechanical Engineering; at that institution I was called by President Ricketts to inaugurate a new department of Mechanical Engineering to supplement their Civil Engineering course, and also I have done the same thing at Princeton, organizing a school out of the department of Civil Engineering and Electrical Engineering to include my own specialty of Chemical Engineering and Mining Engineering.

My original training was done at the Uiversity of Pennsylvania, at which place I graduated in 1893 with the degree of B. S., and in 1894 I received the degree of M. E.

In 1916 the University of Pennsylvania honored me with their honorary degree of Doctor of Science; and on leaving Rensselaer Polytechnic Institute, they also honored me with the degree of Doctor of Engineering.

Q. In the course of your professional work, have you had anything to do with that branch of engineering known [fol. 265] as Heating and Ventilating?

A. I have had much to do.

Q. Have you written any books on that subject?

A. I have written a book on The Elements of Heating and Ventilating, and another book on The Elements of Refrigeration. I have taught these subjects for 20 or 25 years, and I have had practical experience in the design, installation and operation of such plants. I have had some experience in my early professional life with the Committee of Science and Arts of the Franklin Institute, of which I am a member, in dealing with meritorious inventions, examining patents, examining the literature of the time, to find out whether these were real improvements, and then, in addition to that kind of work, I have served as an expert in a number of patent cases, some of them dealing with this art of heating and ventilation.

Q. Have you made any particular study of the art of incubation, with particular reference to heating and ventilating problems?

A. Yes, indeed.

Q. Will you tell the Court to what extent you have investigated this question, with special reference to this particular suit, so he will know your qualifications in that subject?

A. Of course, your Honor, in my own work, originally, before this suit started, I had to study the problems of air-handling and air-conditioning, and I also had to teach the subjects, and then, in connection with this suit, I read much of the history of the industry, and I looked into the methods of hatching. Then I studied a number of patents, and in addition to that I have visited several of these large Smith incubators, in one of which, at Frenchtown, New [fol. 266] Jersey, I made some tests on a 50,000 unit incubator, such as we saw in the building—it was not of this late type, but it was of that capacity; and then I visited a plant in Dayton, Ohio, and I visited a plant in Trenton, but was not able to see the machine in operation.

Then I have visited a number of the James way plants, the plants of the James Manufacturing Company, and have made certain tests on a unit with glass sides similar to that which Mr. Taggart has prepared for the Smith Company. I have made a number of calculations regarding heat transfer, both from the box itself and for the amount

of humidity which must be provided for by water—by the evaporation of water.

I have investigated Mr. Taggart's charts showing the amount of heat produced per day, and have reduced that to the form of heat per day per thousand eggs, in the average condition; and in addition to that, of course, I have studied the Smith Patent very carefully, as well as certain prior art patents which bear on this subject.

Q. And have you had occasion to read some of the records of the Court proceedings on the Smith Patent?

A. Yes, I have read the file wrapper of this particular patent, and in the preparation of my affidavits which I prepared for this Court last summer, I read very carefully the decisions in the exhibit prepared by the plaintiff in this case.

Q. Now, will you state to the Court, briefly, but as clearly as you can, your understanding of the construction and method of operation of this patent in suit, which is the foundation for the later questions I am going to ask.

A. Your Honor, I realize that you have gone over this [fol. 267] patent of Smith's 1,262,860, and on account of certain details which I feel were not stressed properly, I may tire you by going over them again, but I do want to call your attention to a number of what I believe are very important things.

In the first place, Mr. Smith, as he states on page 1, line 8, prepared this improved apparatus and method, which was "particularly designed for extensive operations wherein a chamber of large dimensions is adapted to contain thousands of eggs in separate trays arranged in tiers and the method of heating is such that the heated air is adapted to the eggs in various stages of incubation. There is a forced circulation of hot air through the chamber which is adapted preferably to maintain all eggs at temperatures between 100 degrees and 105 degrees Fahrenheit approximately and this improved system contemplates that fresh eggs will be placed in a horizontal plane, preferably by means of trays supported in horizontal planes, and after the eggs have been subject to the circulation of hot air for a predetermined time (the air circulating largely around the eggs) they will be placed in a tilted or inclined position in a different location but still subject to the same column of air and at this period of incubation they will be tilted

in different planes at regular intervals during the time they remain in this latter position, and after they have remained for a predetermined time they will be again moved to a different position with reference to the forced circulation of hot air and so placed therein that the air will tend to keep the eggs below 105 degrees temperature, and in this last named position the air will be forced to pass be- [fol. 268] tween the different eggs and will in effect act as a cool medium for the eggs."

I want to stop there, Sir. The patentee discloses here a large room which, on Page 1 and at Line 67, he says is approximately nine feet high, eight to ten feet wide, and of any desired length; and into this room he brings the eggs which are to be arranged in staged incubation, as you have already been told.

In this particular part which I have read, I would like to call your attention to three positions of the eggs which Mr. Smith definitely describes here, and again in two other places. He says he first puts the eggs into the horizontal trays which do not tilt. Then he puts them into a second place where there is tilting, and he states that the air circulates largely around the eggs. I want to have you note the expression that he uses here; that is, in the upper tray, and then in the next six trays, he has eggs in which the air passes largely around them.

You will notice that there is a large clearance space 27 through which much of the air may pass, and that 27 is continued up between the stationary eggs.

Now, after specifying this, he then comes in with this which I have just quoted, the last part, and he says there he will put the eggs in a place where there is forced circulation, and as was noted this afternoon by Mr. Taggart, that strap 28—that is the lower 28 in this case, because the upper one is the outlet—that strap prevents the air from going up through that lane and causes a high velocity around the eggs.

So Mr. Smith has definitely pointed out, so far, three distinct positions, the stationary trays, six movable trays or [fol. 269] tilting trays, and finally three others which have a definite higher speed, as he says, to have the heat removed from these by a high velocity.

Now, I think it was said this afternoon that velocity did not play any part in this. Velocity plays a considerable

part, as I think the Court pertinently asked with the idea that it did play a part. It does play a part, your Honor. The higher the speed, the smaller the air film on the eggs, which prevents the heat from coming out or going in, and also the higher the speed, the greater quantity of air passing by, consequently less change in the air. So you are perfectly right in asking whether that speed did not affect heat transfer and temperature. It does, and Smith recognizes it.

Now, he goes on, next, beginning at line 48: "It is manifest that the temperature will remain practically the same throughout the column of eggs, but the air is impelled with sufficient velocity to carry the heat away from the eggs which happen to be in the advanced stage of incubation."

Going a little further, while we are still talking of these three positions, plus the lower one, on page 1, in the next column, beginning at line 81, he then refers to the tilting racks 10, and he then says, beginning at line 84—I think I will start at line 81:

"A series of stationary racks 12 are also arranged beneath the tilting racks 10, and all of said racks are of open construction and of the same size to permit interchange of the shallow trays 13 from the eggs to be hatched."

I would like to call your attention——

[fol. 270] Q. "For the eggs to be hatched," Dr. Greene.

A. I beg your pardon.

Q. You said "from"; you mean "for", do you not? You mean "for", do you not, after "trays 13"? You said "from".

A. "For the eggs to be hatched." "These trays are—"

By the Court:

Q. Where do you find 12 on the Diagram 3?

A. Right on Fig. 3, right in the middle of the wood tinting, which represents the upright which support the brackets for the stationary trays.

Q. I am looking for 12. Where is that? It is not on mine. It is on Fig. 2 at the bottom.

A. I beg your pardon.

Q. It says Fig. 12; that is way down at the bottom?

A. Yes, and we are talking about these three trays, 13, which rest on those, but right above, there was reference to

the first three positions. We are now dealing with the fourth position.

The Court: All right, go ahead.

The Witness: Continuing on line 87:

"These trays are provided with open mesh bottoms 14 upon which the smaller ends of the eggs rest in close and solid formation, and each tray of eggs occupies the upper rack 9 for the first three days, and is then transferred to a place in the upper end of the tilting rack 10. During the next 15 days the trays in the tilting rack are shifted from higher to lower planes therein and tilted at frequent intervals to stand in oppositely-inclined positions. The tilting of the eggs is preferably arranged to put the eggs substantially on their sides. When the eggs in the lowermost [fol. 271] trays in the tilting racks 10 are about ready to hatch each tray is transferred to the stationary rack 12 where the chicks may be removed as occasion requires."

In the first column, which I have read a few moments ago, the patentee speaks of the early stages of incubation, but here he says that when they are about ready to hatch—which he means separate from the other, because that is a distinct period—he moves them down to the lower place.

Now, in order to handle such a large number of eggs without cooling off the box and without shutting down the fan, this patent discloses—I can only use the patent disclosure, your Honor. What Mr. Smith had in mind, I don't know, what he really meant, but I know what he says here. He provides a place called a corridor, No. 5 on Fig. 1.

Now, that corridor is not a mere passage for the travel of air, or electric conduits, or water. It is a corridor in the true sense of the word. I realize perfectly that, although a dictionary says that a corridor is a passage in a building, that Mr. Smith would have the right to call anything a corridor that he might want to; but whenever he uses the word "corridor", it must be what he had in mind, and here he distinctly calls No. 5 a corridor, and when he refers to "corridor" elsewhere, this is what he has in mind.

On page 2 he again describes this arrangement of eggs. He seems to have that in mind a number of times, and beginning at line 28, he states:

[fol. 272] "As explained later, the trays near the bottom are preferably arranged—"speaking of the trays arranged

in vertical order—"As explained later the trays near the bottom are preferably arranged so that the air is forced to pass between the eggs in each tray thereby cooling or holding the temperature of those eggs down. Thence the air passes into spaces above the lower series of trays until it reaches the distributing space 21 above the fan." That is the space at the top, looking at Fig. 1, at the top of the corridor in which the fan is located.

Now, at the bottom of this first column on page 2, the patent states that:

"In Fig. 3 only a single curtain 3 is shown in place, the curtain or curtains at the right being entirely removed to disclose the racks and trays in full lines, and it will be also noted that the vertical spaces 27 between the adjacent tilting racks 10 are closed at their lower ends by flexible strips of fabric which are attached to and extend upward at each side of each rack so as to compel the air to circulate through the mesh bottom and around and about each egg as heretofore referred to, and as the eggs further advanced in incubation are contained in these lower trays and as the danger is that the temperature will rise in these eggs to a point injurious to incubation the improved method disclosed herein permits the circulating air to act as a medium to prevent the overheating at this stage of incubation and this is accomplished by promoting an induced draft within the lower trays."

Now, we have there an expression of induced draft in these lower trays, as Mr. Taggart has said, and as the [fol. 273] patent states. This is a forced circulation or forced draft machine. In most of our work, we speak of forced draft where we are dealing with pressures above atmosphere. In boiler house work, particularly, we mount a fan on the boiler-room floor; we pump the air into our firebox beneath the grate to such an extent that it would support a water column of seven inches or six inches, and we speak of having a forced draft of four-inch pressure. Now, in order to remove the gases from our boiler, if we do not have a chimney, we put another fan on the other side and suck the gases out from the boiler, producing a low pressure within, producing a pressure on the entering side of that fan below the pressure on the exit side, and that we call an induced draft fan.

Now, in this particular case—and this is very important, your Honor; if you will look at Fig. 1 you will see that the

outlet 28 discharges into the atmosphere. The inlet, directly—well, it is No. 3 on the machine; it is directly over the No. 24—is also open to the atmosphere. These two pressures are the same.

Now, the fan, which we will talk about later, produces pressure on the lower side and produces a suction or induction on the upper side, sucking the air in through the regulated opening 24, as the pressure within 21 is sub-atmospheric, it is open to the atmosphere above, and the atmosphere is not entering, must be at a pressure above the atmosphere, and therefore this fan is producing pressure, we will say, slightly above—not very much above—the atmosphere at the top; but as we go down in this channel, the resistance means that we must carry more pressure below, [fol. 274] and then we get up to the fan itself, we have the greatest pressure.

So that this word "induced draft" in the egg chamber, to me, cannot be explained by the ordinary term "induced draft", because the pressure is above atmosphere.

Now, sometimes, when air passes in an orifice which is converging, it produces a place of low pressure, due to that high velocity, and air is sucked in. It may be that Smith had that in mind, or it may be that he means merely that the air is being induced into this place, or inducted, going back to his derivation of that word, and used it there. Otherwise, I cannot understand what he means by "induced draft". He does not say, up in 22, but he said "and this is accomplished by producing an induced draft within the lower trays". That is the place where the pressure is high. The pressure is near atmospheric; or if someone would say it would be below atmospheric, which it could not be at the top, it might be an induced draft, but there is no induced draft in the lower trays.

By Mr. Toulmin, Jr.:

Q. At that point, Dr. Greene, is there any induced draft in the egg column?

A. I beg your pardon.

Q. At that point is there any induced draft in the egg column?

A. At any point?

Q. Yes, at any point?

A. No, sir, there is not.

Q. How would the air get out of the opening 28 unless there was pressure in the egg column?

A. There is no way that I understand, because if there were not pressure atmosphere, and we have such a large [fol. 275] opening as these openings in the actual machine are, the air would seek its way in and not come in through the regulated opening 24 and you would defeat the object of the machine. The pressure must be—and we have on Mr. Taggart's chart, if I recall rightly, a velocity of somewhere near 116 feet a minute through these openings 28; and, of course, that velocity is dependent entirely, as Mr. Taggart properly said, on the amount of opening in the valves 24. That is, if you close the valves 24, you practically have no discharge. You have no discharge. You open it a little bit and you do get a discharge; and open it more and you get more.

Now, under the condition during the test which Mr. Taggart made, of which I know nothing, his results show that the velocity there, as I recall it, was in the neighborhood of 116 feet per minute, which means, of course, that air is leaving and the pressure should be super-atmospheric.

Now, if you had very high velocity, maybe five or six or seven hundred feet, since there is such a thing as the consumption of kinetic energy and potential energy being constant, a high velocity below 28 might cause a discharge with a low pressure. At that time, however, air would not flow over 22 into 21. I can definitely say, in my opinion, from the observation of this machine, that there is no subatmospheric pressure at the top of the egg chamber.

By the Court:

Q. What, then, is the conclusion to be drawn from your statement? Do you mean by that, that the air will not circulate around?

A. Oh, no, sir.

[fol. 276] Q. Into the chamber, 21?

A. No, sir, I do not. I say that, if there might be high velocity to send air out through 28, when the pressure below 28 is less than atmospheric, then such a condition would probably pull air from 21 over into the egg chamber.

Q. Well, then, you think the velocity is less than atmospheric there at the top of the tiers of eggs?

A. I think the velocity of the air at the top of the eggs, in the open space, above the stationary eggs, from Mr. Tag-

gart's figures, would be in the neighborhood of eighty or ninety feet a minute in that large space. Now, with a velocity of 116 feet going out, which is greater than the velocity below, there must be pressure pushed out, and from Mr. Taggart's figures, I will show your Honor that the velocity in that wide open space, with no obstructions, will be about eighty feet a minute.

Q. Where will the air go then?

A. It will be sucked over into 21. There is induced draft across the opening above 22. There is a distinct induced draft there, because the fan produces a sub-atmospheric pressure in the space 21, which does two things; it sucks the fresh air through the opening 24 and brings air over for recirculation from the top of the egg chamber.

Q. Well, do I draw the conclusion from your answer that air is not proceeding at the speed that Mr. Taggart testifies as it goes through these egg chambers?

A. I will compute for your Honor by a very simple method, using Mr. Taggart's data, that the velocity, with no eggs or no obstruction at all in the egg chamber, should be more than sixty feet. It would be in the order of eighty feet a minute, with nothing in there.

[fol. 277] Q. Well, would it vary at different points?

A. Yes, it might vary; that is very true, sir. So, if we have one 60, and another 80, and another 100, that is perfectly possible, but as soon as you put the eggs in there to occupy 80 per cent of that space, and leave only 20 per cent for the air to pass through—I have not computed my figures, so I am just using a hypothetical condition—the velocities must be in the order of 350 feet, if there are eggs in there; and I can give you the data from which that conclusion would be drawn in a very simple way.

Q. Well, is it your argument that there is no forced circulation?

A. Oh, no, sir. There is forced circulation. I do not want to say there is not. There is forced circulation.

Q. I might draw that conclusion from your——

A. No. All I want you to understand—I am trying, your Honor, to bring out what Mr. Smith has taught in this patent. I am not trying to say that the patent does not mean what it says. It does; but I do not want you to get an incorrect conception.

Q. I thought you intended to mean that the description as given in the patent would not work?

A. No, sir. It will work, absolutely, as the patent says; it will work, absolutely, it will work.

Q. What would be the effect if the opening in 28 and the opening in 24 were the same size with the degree of velocity of the fan as it has been demonstrated?

A. If the opening 23—the combined areas 28 were equal to the area 24, I believe that there would be a—this is an absurd answer—there would be more than if we closed down 24. But let me put it another way: If the two areas are the same, then I think that the areas 28-28 would do the [fol. 278] controlling of the amount of fresh air brought into that machine.

Q. That is, the pressure——

A. The pressure and the amount of air which went out would control the amount which came in; but as soon as you begin to close 24, throttle it down, then you do stop air from going out 28, because no more can go out than that which has come in, as Mr. Taggart has properly said.

Q. All right.

My Mr. Toulmin, Jr.:

Q. Go ahead, Dr. Greene.

A. Your Honor, I would just like to say that from line 79 down to line 96, Mr. Smith has again spoken of these four different positions. That is, there are really three different places in this specification and one extra little one for a particular place where he harps on the stationary place at the top; then a distance of six trays which are in the tilting position, to exercise the embryos, as Mr. Taggart said, and as the Doctor said this afternoon, which was practically the same thing; then three lower ones, through which he wants to force the air for the purpose of getting the heat out quickly, and then the bottom one, which he says, in line 94—he states it this way: "and thereafter placing the eggs into the final position of the hatching operation."

By the Court:

Q. Well, how does he force air through those two lower trays, if the air comes down and goes beneath the curtain from above the three trays? What do you mean by that?

[fol. 279] A. If you will notice, your Honor, the present embodiment is not the Smith patent——

Q. Well, I am speaking about this description here.

A. Now, in this description, he allows the air to enter the stationary hatching trays at the bottom through openings right above their front member. If you look at the three trays 13, beneath the canvas, you will see, right under the circular finger pull, an open space. Air can enter there and go rushing into that top layer. Then the air can also go into the next one, and to the bottom one.

Now, you will notice that there is much more space for the admission of air under the bottom tray, because that tray only gets its own supply, but the second tray from the bottom gets that which went through the first, plus the fresh air which has not been heated up, and then the top one does the same thing.

Now, the commercial embodiment differs from the teaching of this patent in a number of ways; and it is the patent, as I understand it, we are discussing, and not that commercial embodiment. After air rushes by these lower hottest eggs, removing heat, it then has to run by three more which are still also in this hotter period, and then finally it can escape out into the part 27; and, of course, some goes through the egg trays, too, and also through the top trays, which are in the first stages; and in this, at line 85 which is in this last group, breaking into the sentence, he says, as follows:

"and held in a horizontal plane until they reach a predetermined stage of incubation and then put at a different level."

[fol. 280] That is, he speaks of the period of incubation and the last thing he talks of—whether the trade does or whether the circulars do—Smith definitely here speaks of a hatching period as a distinct entity which he seems to have known about.

Now, I would like to call attention to the fact that the opening 28, Fig. 1 I am referring to—is in the egg chamber. It is not in the suction chamber of the fan, nor is it in the corridor; and Smith, where he speaks of it, speaks of the "restricted openings of sufficient capacity for the

escape of foul air in this closed chamber." The exact words are, without any punctuation in between, "A method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings."

That is, the closed chamber, as he shows in his picture and as he actually talks about, is attached to this egg chamber and not somewhere else in the system. It is not an opening to merely get air out; it is an opening which has to be in this position to operate this machine as Smith wants it operated, and there is no question about its operating just as he says it should.

Now, the controlling means, as has been explained to you this evening by me, and also by Mr. Taggart, is not the size of this opening 28, but the size of the damper 24, and so small is the inlet arranged at times with such a device as is shown over on the exhibit of the plaintiff, that when I visited this large plant of 700,000 eggs capacity—fourteen of these fifty thousand egg machines of Smith were in this plant—the damper was closed off so that I could not measure any inlet of air at all. That is, I must have struck the [fol. 281] place at the period when they wanted to raise the humidity high and they proceeded to move the little damper over that closed off all the inlet. My anemometer would not move. So that this restricted opening which Mr. Smith calls for is not the thing which controls his amount of air, and therefore the patent is not responsive to the claim. That is, he calls for something and he does not get it by the means which he calls for; but whether it does the controlling or not, he says that this outlet opening must be in the egg chamber, and he so calls for it.

Now, I would also like to call attention to the fact that the door 8, which is indicated in Fig. 3 on the second sheet at the left, is large enough for a man to enter, and you, yourself, your Honor, were in such an incubator hatcher and noticed that this door was large. The width of the aisle in this machine is about three feet and one half, and the curtain which comes down forms the egg chamber, which is about three feet deep. The egg chamber at the other side is another three feet, and, of course, we must realize, in looking at this Fig. 3, that the curtain, when placed down in front of the lower trays, or the upper ones, too, and held there by pressure of the air in this central cham-

ber, it is at higher pressure than the egg chamber, as it must be, of course, because as you go from the fan down, the pressure is getting less and less and less; or if you go in the reverse direction, the pressure is getting higher. The pressure back at the reservoir is always greater than the pressure at the house. So that higher pressure in the corridors is the thing which holds that curtain against the egg [fol. 282] trays. It definitely shows that it is greater. Of course, it is required to be there in order to force the air in.

Now, I do think, your Honor, that cutting this curtain off above the egg trays does change the distribution of air. Why they did it, I do not know. Probably they found they did not have to have it go onto those hatching eggs to remove quite as much heat as they thought they would, but the Smith patent calls for the curtain by his disclosure, to come to this particular level.

Now, on page 2, at line 45—I think we had better begin at 43. The patent states:

"The outlets 28 for the release of foul air are made of such restricted capacity as to prevent the undue escape of moisture."

Now, what "the undue escape of moisture" is, I cannot find out in this patent. That is, I know that if you want to stop moisture going out, you stop it going out; and what "undue" is, he does not say. We have learned today from Mr. Taggart that, years ago, the undue loss of moisture was not the undue loss of moisture, since 1928, I think he said, where they wanted to raise the moisture in order to bathe the eggs with the proper humidity. It appears, whenever we are going to have a gas or a vapor leave one body and enter into another one, there is such a thing as vapor pressure on the outside, and to prevent the eggs from giving up moisture too rapidly, we must have water pressure, water vapor pressure, on the outside, to balance, to a certain extent that on the inside, to keep down the rapid evaporation.

Now, what was "undue", as I take it from Mr. Taggart's practice, what was "undue" when this patent was written, [fol. 283] is not undue today. We did not conserve as much then, and what this patent means—there is nothing in here that states it, except the words "undue loss of mois-

ture"; and, to my mind, the important thing about this is the control of carbon dioxide which comes off from the eggs, as well as this moisture, but he says nothing about that. He says only that he wants to cut down the undue loss of moisture.

Then he goes on to say, in the next sentence:

"It is possible to limit the openings and so conserve the moisture by reason of the vitalizing effect of the power-driven current upon the body of air within the chamber."

Now, that is another one that I do not understand, what "the vitalizing effect of the power-driven current" is. To me, an air current is an air current, and with fans, in a small space, you can create currents, whereas you can produce those same currents with a chimney of much greater height, and you would not do it if you did not want to do it for some other reason. If you wanted to get some current with a fan, you would, by the fan; and whether the current is produced by an ejector, a steam jet or by a fan, or by a chimney, if it has high velocity, the thing against which it rubs does not know what caused that velocity. All it feels is the velocity; and what "the vitalizing effect of the power-driven current upon the body of the air"—not upon the eggs, but "upon the body of the air within the chamber", means, I cannot understand; and I think, again, this patent is ambiguous and is not definite.

[fol. 284] By the Court:

Q. There would be moisture in the air and moisture coming from the eggs, would there not?

A. Yes, sir.

Q. You mean, by "conserve", to equalize the moisture, to make it what it ought to be?

A. No, I think it means to keep it from going out.

Q. Keep it from going out of the egg?

A. No, going out into the atmosphere, by closing the valve, as was done in the old so-called still air incubators, which I will not call still air, but the original one-tray incubators.

The patent calls, if you will look, please, at Fig. 3 on page 2, calls for a steam pipe up at 26, so that if the air which enters from the outside is not of the proper humidity, Smith

provides the addition of steam to give that moisture to the air; and when we come to discuss the James device of the defendant, you will see that there are other ways of getting this extra humidity.

I would like to call your attention, though, your Honor, to the fact that this steam brings heat with it into this box, and so, when we let the air out at 28, with it goes the heat and the moisture in that air, and the heat of that air above the temperature of the room—normally, the rooms would be 70 degrees, might be lower than that. The incubator has to be held at 99. The difference is 33 degrees, if we make the outside 69 and the other 99, and that heat to heat up the incoming air from 69 to 99, 30 degrees—I want to use it so we can get a round number—is equal to the heat leaving.

Then, also, all of this heat that you have to put in by the [fol. 285] steam to properly humidify the air, goes out.

I say, not only have you got to consider, in this patent, the amount of heat which these eggs give up, but you have also got to figure on the heat which the pipes 23 on Fig. 2—those are the steam pipes or hot water pipes which have to supply the necessary heat to the incoming air. Now, all of that heat which is supplied, goes out, because the eggs do not use up all of their heat that they produce, as I will show you from Mr. Taggart's drawing. So that, in this machine, we see that, in order to practice what Mr. Smith is teaching, you have absolutely got to put your eggs in a regular order, from the earliest eggs at the top to the hottest eggs at the bottom, because in that way, and only in that way, will the heat from the bottom go continuously through and touch those colder eggs. If you take the circuits of some of this air, you have to consider the heat which goes off there, which is more, much more than the heat which the eggs give.

So that only when you follow Smith's teachings in arranging these eggs not at any level—where he uses the word "level", he means definite level, 1, 2, 3, 4, of which I spoke—only when you put the eggs in that order can you say that the heat from these hot eggs will pass up onto the colder eggs.

For a moment, let us just reverse it, your Honor, and put the cold eggs at the bottom and the hot eggs at the top. Then the air will have to be brought in here possibly slightly

warmer, to give heat to these eggs. As it goes up here, it gains heat. Now, that heat does not come back here again, [fol. 286] but it goes out through that door. When you figure on even one-half per cent.—Mr. Taggart said, and also, in the opening, I believe Mr. Ely said, the change is one per cent.—even making it one-half per cent., and even with this big amount of heat of Smith's, you lose more heat than you put onto your eggs, and therefore, when you go around this, you have to put in extra heat from the hot water pipes.

Now, Mr. Taggart said, and I think quite fairly, that we are not tagging one single heat unit which came from the egg, and if it comes back again, we will say that it is transferred. Of course, we should not do that; but when we take it in the whole, as a complete unit, there is more heat leaving here than is coming from the eggs. Therefore, in a closed circuit, you do not bring the heat back again, but in the Smith arrangement, all of the heat that comes out of these lower eggs does bathe the upper eggs as it goes up, and gives heat out as they are ready to receive it. Smith is perfectly right, and his meaning is clear. It is an operative device; outside of a few ambiguities, all he said is true, but change the order and it is not true.

The reason for that is that, heretofore, I think—I was not present at the trial—heretofore they treated that as a single circuit, neglecting entirely the heat that goes out through this fan, and trying to figure—it is not a small quantity; one-half per cent. looks very small, but when you figure it on the vast amount of air that is being handled, and raise it 30 degrees, and put into it humidity, that is a big item; then you find that the amount of heat removed is much more than the 50,000 eggs will give.

[fol. 287] Q. Suppose it is; when it comes over, cooled, until 21 there, will it not have heat again from the pipes?

A. It will get it from the water, but it will not be egg heat; that is my point. Mr. Smith calls for the hotter eggs and the hottest eggs to give up heat to the coldest eggs. That he absolutely does. Now, if you sandwich these in, as has been shown in a number of devices on the market today, Petersime and the others, Robbins and Bundy, if you sandwich these in, then, if you do not have your hottest eggs at the bottom and your coldest at the

top, you cannot say that that heat goes around the eggs. This is not a closed circuit.

Q. You mean by your answer——

A. I mean that neither in material nor in heat is it a closed circuit, because you are blowing out material here and with it you are blowing out heat which is greater than the amount of egg heat.

Now, even if it were not greater—suppose it were only 50 per cent., or only 20 per cent. of the egg heat, you could not say that all that egg heat came back and it is not material because you are blowing the air out and blowing it in.

In addition to that, you are blowing steam in, in the pipe shown in Fig. 2 as No. 26. So that it is not a closed circuit.

Q. You mean, by "closed circuit", one from which there will be no emission?

A. Emission or admission of heat from anything except the air. Now, if it were a closed circuit, no one could say that the heat did not return and go around there, but it is not a closed circuit, and both heat goes out, moisture goes out, air goes out, and some things come in, from another source, to the eggs.

[fol. 288] By Mr. Toulmin:

Q. Now, Dr. Greene, let me ask you, right at that point: Have you made a calculation, so you can give the Court the exact figures in support of those last general statements of yours, about this operation?

A. For Smith?

Q. For Smith.

A. I have estimated, your Honor, from the data supplied on the chart of Mr. Taggart's, that if the Smith machine were loaded, the average amount of heat per thousand eggs per 24 hours, over an average period, we will say, of complete incubation, would be 3,575 British Thermal Units, which is our unit of heat, being the heat to raise one pound of water one degree.

The amount of heat to heat the air 30 degrees, using the figure which Mr. Taggart has given us for the amount of air handled by the fans, 1,500 cubic feet per minute per fan, using the one per cent. humidity, the amount of heat for the air is 900 British Thermal Units per thousand eggs

per day. That is only one-fourth of the heat from the biological action. The heat supplied by the stream, however, for humidification, would be 2,540 British Thermal Units, and the amount of heat lost through the walls would be 521. So that we have there approximately 4,000 British Thermal Units delivered, wasted, and 3,575 given up by the eggs, showing that there is more heat, much more heat lost than is given by the eggs; and were it only 500, or even a smaller amount than the 3,575, the same statement could be made, namely, that it is not a closed circuit as far as heat is concerned; and, of course, we know it is not as far as material is concerned.

[fol. 289] Q. Proceed with your patent; you have not finished.

A. Now in the patent, there is a statement regarding the way in which this current of heated air is produced. In Claim 1, it has to be produced by other means than a variation of temperature, and that, of course, means the gravity method of circulation. Not to be critical, in a way, I do not think we should call these convection currents because, normally, convection currents mean currents carrying heat in the material, and that can be formed by a fan as well as anything else. I know what the combination is, and I think it would be better to call it gravity circulation; and it seems that Claim 1 asks or calls for some method other than the hot air method.

However, when we come to Claim 2, it speaks of a power driven current, and power, in this sense, of course, means energy; and although the form shown in the picture is a motor driven fan, this claim could, in my opinion, refer to a chimney effect current, because it is power.

Now, we come to the third claim. He speaks of a "mechanically moving means", and "mechanically moving", I think, means something that is rotated.

In the fifth claim, the claim distinctly asks for a power driven fan. There it is quite distinct and definite. In this patent, Mr. Smith is taking his eggs from the earliest stage of setting, to use another term which is sometimes used by poultrymen, from the time heat is applied in order to develope the egg to the hatching out of the chick; and as shown by Mr. Taggart in his chart, the last three days are the peak days for heat production. Mr. Smith had the problem

[fol. 290] of handling that big amount of heat, and he does it, as you can see from my numbers, by taking out just about as much as this brings in, which is a large quantity of heat to be handled and a large quantity of eggs; and this is his solution, which is a solution and it will work just as he says it will work.

However, in it, he does require this corridor, which is not a mere passage; and in talking of the James Way passages, usually. Mr. Taggart spoke of them as ducts or channels; and then, when Mr. Ely referred to them as corridors, meaning these devices here, he spoke of those channels and ducts as corridors.

Now, I firmly believe that if Mr. Smith in a patent, had made a small passage here, 28, which no one would call a corridor, and said that was a corridor, in this patent, that would be a corridor for the patent; and so, when the word "hatching" is used, or "setting", or "incubation", what other people mean may be quite different from what Mr. Smith means; and he uses here something that I do not understand, what the word "vitalizing" means.

By the Court:

Q. Well, is the word "corridor" to be construed in connection with the context, to show what it is applied to?

A. Yes, I think it is. I think, when Mr. Smith draws his claims, he is drawing them with this specification and the drawings before him.

Q. Well, does he say anything about the size of the corridor?

A. In this patent he says that it is one in which—let me get the wording here. He does not give any size, but he [fol. 291] gives a drawing. He says the figure which he is picturing is nine feet high, eight or ten feet wide, and any desired length; and then he says:

"Entrance to the corridor is gained by a door 8, and the compartments behind the curtains contain elevated stationary racks 9 which are within convenient reach of the attendant for introducing the fresh supply and from which elevated position the trays may be shifted at the proper time to a tier of tilting racks 10 on a lower plane and suspended therefrom by links 11."

In other words, this thing which he calls the corridor 5 has in it trays, stationary runs within convenient reach. It has a door for the entrance of the attendants, and to me, this particular disclosure is for a large capacity device to carry eggs from the earliest stages of incubation up to and through the hatching period.

(Short recess.)

By Mr. Toulmin, Jr.:

Q. Dr. Greene, referring to the Smith Patent, particularly Fig. 1, what would happen to the operation of that machine if the cold air inlets were placed beneath the hatching trays at the bottom of the egg column?

A. The heated air from the pipes 28 would partially run out into the atmosphere and would not ascend through the egg column, and at the top of the egg column there would not be as much returned air because of the higher pressure on the discharge opening.

Mr. Toulmin, Jr.: Will you read that answer, Mr. Reporter, I must have missed something.

(Answer read.)

[fol. 292] Mr. Toulmin, Jr.: Will you read the question again to the witness? I do not think he has completed the answer.

(Question read.)

A. It would not work. As I have said, that would be a place of high pressure, and there would be a delivery there, so that if the inlet were placed at the bottom of the egg column—will you read the question?

(Question read, as follows: "Q. Dr. Greene, referring to the Smith Patent, particularly Fig. 1, what would happen to the operation of that machine if the cold air inlet were placed beneath the hatching trays at the bottom of the egg column?")

A. As I said first, if the air inlet were placed at the bottom of the heating element of the egg column, no air would flow in but the air would flow out at that point, and then the atmospheric pressure would be established at that point and this egg column would then become a sub-at-

mospheric column, so that the pressure, as you went up, on the egg column, would get lower and lower, and this would be a true induced draft or sub-atmospheric pressure column.

Q. Now, Dr. Greene, suppose that we put the fan of Smith, instead of at its present location, at a point at the top of the egg column, blowing upwardly, what would happen to this machine?

A. The egg column would then be a suction column and a large quantity of the air would pass out through pipe 28 because it is directly in line with the fan. The air would also be blown over above the plate 22 and some would [fol. 293] escape through the so-called inlet. However, there would soon come a time when the amount discharged through 28 would be so great that I believe that, then, the opening 24 would become an inlet opening.

Q. If the fan were located as we are now discussing, to direct the air upwardly from the egg column, the fan being located over the egg column, would the egg column beneath the fan be a pressure column or a sub-atmospheric or suction column?

A. It would be a sub-atmospheric or suction column, the fan directed upward and pulling the air up through the egg column.

Q. Now, Dr. Greene, have you examined the defendants' machine, the James machine?

A. I have.

Q. Will you be good enough to describe the operation and construction of that machine as you understand it. Will you look at the drawings that are before you, of the defendants' construction, and use those for a brief description of the defendants' construction, bringing out those points that you think should be emphasized in connection with the operation and construction of the defendants' device?

A. Your Honor, the vertical longitudinal section shows two egg compartments directly below the word "water-pan" on this drawing. In each of them will be found ten egg trays. At the center of the space above these egg chambers, and separated therefrom by a cross-hatched partition beneath the water pans and directly above the word "water-pans" is an impeller which, by its rotation at 750 to 860 revolutions per minute, sucks air up through the

uncross-hatched part of that partition from the egg chamber, because, as this impeller rotates, it drives the air out [fol. 294] centrifugally, and, of course, the air has to flow in to take the space occupied by that discharged.

The impeller, your Honor, is before you here. You will also note in the picture that there is another cross-hatched partition directly over this impeller, which has an opening in the center. That partition is the upper part of a chamber within which the impeller turns and through which the air delivered from the impeller must pass. In this longitudinal sectional view, however, at the extreme right and left of the egg chambers, you will see an open space through which the air that enters the top of the impeller must pass, being drawn from this egg chamber.

While looking at this picture, if you will look at the bottom of it you will see the so-called turbulator or stirrer, a sample of which is before you on your desk; and beneath that impeller is shown a pair of dotted holes—dotted lines which represent holes in the bottom of the egg chamber and communicating with the atmosphere. There are four of these holes under each stirrer or turbulator, each one of which is an inch in diameter, so that we have four one-inch holes connected with the atmosphere and establishing at this point atmospheric pressure.

Now, the experiments made by Mr. Taggart indicate that this impeller produces no flow at the top of the egg chamber; its anemometers did not move. He stated that he did not take any readings in the channels or ducts, and he did not know how much was driven out, but had there been any flow upward, it would have appeared back in the top of this egg chamber and would have shown a flow downward, because if there were circuits set up, it would, [fol. 295] of course, have come down in this upper part. Evidently that did not happen, because there was no registration on these upper anemometers. So that we have in this region at the bottom of the egg chamber, a region on which air enters from the outside, which is practically atmospheric—a little bit below, because the air flows in. It may be that the rotation does a little bit of drawing, but in this place the pressure produced by these openings is such that we get here a level of atmospheric pressure, and as a result, the fan is an induced draft rather than sucking the air up into this upper part, and the impeller, which Mr.

Taggart has called a fan, is drawing the material up toward the top.

This device, which I have called an impeller, and called it so advisedly, is merely a set of paddles with plates on each side but no confining shroud or volute casing which makes it into a fan. I will show you tomorrow some publications of the Buffalo Forge Company, or some other fan company, in which you will see the fan must have not only this impeller in it to make it a fan, but it must have the proper surroundings if you want to produce proper velocity. You can produce, by this device as it is, velocity, but to call it a fan per se is entirely wrong. Not to be quite facetious, we may say that a coat or a pair of trousers alone does not make a suit; it takes both of them.

So that this impeller, which some manufacturers call a fan rotor, is not a fan until you put all the parts on it. The top plate and the bottom plate, which Mr. Taggart called the housing, would be the side housing, but in this particular impeller we have no complete surrounding, properly [fol. 296] shaped housing to direct the flow of this air efficiently.

Q. While you are on that subject, Dr. Greene, will you explain to the Court how that impeller, or whatever name you may call it, operates on the air? What is its action on the air, with these flat blades?

A. Well, personally, Mr. Toulmin, I think that the air between the blades, the sector of air between the blades, starts to move with each of them. We cannot say, as we could say regarding this aeroplane, or this plane (demonstrating) that if I push it ahead in the air, I push the air out in front of it, and pull the air behind it. In a fan, I like to think of it as moving a slug of air between the two plates. Now, as soon as that begins to take up the rotating motion, there is set up centrifugal forces and we get so-called centrifugal pressure developed, which causes the air to flow out of it. As soon as it does flow out of it, that slug of air leaves behind it a place of low pressure or vacuum, which other air must flow into, to fill. Now, it is true, undoubtedly, that the advancing blade does push the air and produce a region of low pressure behind, but we must not forget that there is another blade behind, pushing that air around. So I like to think of it as a slug of air contained between the two plates, caused to rotate, just as

we used to throw a tin can of water around our heads; the centrifugal force would pull it out nad hold it out straight; so here the centrifugal force developed on this air produces what is known as centrifugal pressure, and if there is nothing there to resist it, the air flows out. Now, as soon as it does flow out, if we do not put a proper member around it to direct that air efficiently, we merely get a discharge, [fol. 297] and if that discharge is conducted away, we do get a flow of air; and therefore, I think the manufacturer has properly called it an impeller.

This impeller, then, draws the air from the egg chamber, which is a sub-atmospheric location.

If you will now turn, your Honor, to the other section, which is entitled "Vertical cross-section of Defendants' incubator," we see this impeller at the top, driving the air off, and as it goes off, it has to pass over a water pan. This water pan has a top over it so that we can vary the surface. The water pan is at one end of the chamber, above the air chambers, and at one side, looking back again at the first picture, the longitudinal, we notice one water pan on the right and another one on the left; so that some of this air which is delivered has to pass over the water pan called for on the vertical cross-section. You can see it here better. Here is the impeller. Here are the two water pans, and we have the two partitions, one above and one below, which confine the impeller, with clearance, so that when this rotates, these slugs of air, which really are continuous streams, are driven off to the periphery of this large space, part of it passing over these two water pans, and the water pans are covered by a sliding top to regulate the amount of water exposed to the air.

This air then passes to the four openings in the two doors which connect with the body; part of it goes to four openings in the back wall leading down in the hollow wall through passages, channels or ducts, to the bottom of the egg chamber.

[fol. 298] Now, if we open the front doors, we see the bottom of the egg chamber on the left, and in it we see this stirrer which is driven by the same shaft which drives the fan, and right below that impeller or stirrer you will see the four openings which lead in. In this so-called fan chamber or ducts, the James Company has introduced the four outlet openings through which any air that has to be sent out of

this machine, foul air, really circulating air, goes out, and these are each one inch in diameter. So that in this arrangement we have four one-inch holes which may lead air out, and eight in the bottom allowing air to enter.

We can see in this, if we look now at the cross-section, your Honor, that the fan is driving the air over the water; it then passes over these black heating pipes, which are filled with water, comes down through the channel in the back wall of the mixing chamber, comes down the front ducts or channels in the front door to the mixing chamber, and in this place as was show by the smoke of the carbon dioxide, the vapor that was formed there from the water, probably. We had a turbulent condition where the incoming cold air mixed with the warm air from the side walls, that warm air being warmed by the hot water pipe.

Now, a curious thing happens with this James system. The air which is driven by the impeller and caused to pass over these water pans, evaporates some of that water, proceeds to chill the air, because the evaporation of water requires heat, as it does in a boiler, and that heat can only come from the air itself. Consequently, the air is cooled, and this cooling, in the James machine, takes out 3,780 British Thermal Units per thousand eggs per day, whereas [fol. 299] the biological heat given up by the eggs is only 1,275 British Thermal Units per thousand eggs per day, and the amount of heat required for warming the air is 210.

You will note, in this machine, by cutting out the hatching eggs, James has saved or has removed from his machine two-thirds of the heat, practically; that is, the heat during the last three days is 180 per cent. of that during the first 17½ days. So that the heat of the Smith machine, which was 3,780 British Thermal Units per thousand eggs per day, from biological heat—I beg your pardon, 3,575—here is reduced to 1,275.

Now, your Honor, the only way to compare these machines is to reduce it to the same comparable standard, and I have taken 1,000 eggs per day. I did not want to deal with big numbers nor small numbers, and so that unit is the same. If we had made it per cubic foot or per linear foot of air traveled, it would not have meant anything, because they are not comparable machines. This is compact; the other machine is large, because of that large corridor, and

so, by reducing it to 1,000 egg unit, we have a comparable figure.

In going through the James egg chamber, assuming 1,000 eggs of average heat—which means the average during the whole period of hatching, because that is the only way you can get at it—we have taken into the air stream 1,275 British Thermal Units per thousand eggs. We have cooled off the air stream by the fresh air that was introduced, by 210 British Thermal Units per thousand eggs per day. We have taken out of the air by this water, 3,780 British Thermal Units, taking out by the water alone practically three times [fol. 300] as much as the animal heat. So it shows very clearly in this case, the animal heat put in is more than used up by humidification of water. Then it passes over these pipes to regain its heat. We throw out here practically all the heat that was put into this air in the form of temperature rise and humidification, and it leaves it at this point. Then we bring it down to this place, and here we have not the stream of heated air from the corridor, but we have a stream of air made up of several hot streams from passages, plus a cooling effect of this cold air, and it is not responsive to this Smith Patent at all, because this is not a stream of heated air. It is a stream of cooled air, if anything, by this cold air at the bottom.

Q. At that point, Dr. Greene, drawing a conclusion for the benefit of the Court, from these figures, do you say that any of the animal heat of any of these incubating eggs is carried around from the top of the egg chamber to the bottom, and conveyed to the eggs a second time?

A. I say, no, it is not, in the sense of the Smith Patent, and in the sense given to it by Mr. Taggart in his testimony, where he said we should treat the thing as a whole, which is the correct way. My answer is, No.

Q. And the reason given for that is that the animal heat that may have accumulated at the time you get to the top of the egg chamber, is removed in its eventual process, before the air returns again to make another entry into the egg chamber, is that correct?

A. That is correct, and more than that amount, of heat is removed, which has to be restored by the hot water pipes.

Q. Then the next question I want to ask you is whether, [fol. 301] in the Defendants' machine, you have in the egg

chamber a condition of sub-atmosphere of super-atmosphere; that is, do you have a condition of suction in order to get the cold air in with the hot air, or do you have a condition of pressure? Which is it?

A. We have a condition of suction to get the cold air in, because there is atmospheric pressure outside the box, and to get air through there, the pressure must be less at this point, and since there is friction here, the pressure at the bottom must be higher than the pressure above, so this must be still further subatmospheric.

Q. Yesterday, when we were having a demonstration by the Smith Company on the Defendants' machine, do you recall the taking of readings by anemometers in the lower trays, the intermediate trays and the top trays, by Mr. Taggart and yourself, in the presence of his Honor?

A. I do.

Q. Have you a record of the readings that you took as to air speeds from the bottom up to the top?

A. Mr. Taggart and I read these together. The first reading, near the middle, was 136 feet per minute. Two rows from the bottom, zero, and up in the second row, 145 feet per minute.

Q. Well, then, to restate that in the order which it occurs, from the bottom to the top, it was zero, 136 and 145, is that correct?

A. That is correct.

Q. In other words, the speed of the air was greater at the top of the egg chamber than at the bottom, is that correct?

A. That is correct.

Q. And what mechanical reason is that due to, by reason of the peculiar construction of the James incubator?

[fol. 302] A. I think the principal reason for that was the interchange in the air passages. Of course, the pressure being less at the top than at the bottom, the air would expand slowly, but I do not think it would account for the difference which occurs here.

Q. Let me ask you this question: What is the action of that aluminum member, that impeller, as we call it, with respect to moving the air through the egg column, if it does move; is it pressure action or is it suction action?

A. It is suction action, absolutely.

Q. Does that air rise through the egg column after having been churned at the bottom by the stirrer?

A. It does.

Q. Due to pressure from the impeller, or due to suction of the impeller?

A. Suction of the impeller.

Q. And why is it that the suction of the impeller makes it do that? Show his Honor that thing, so he can see.

A. On the model itself, your Honor, we turn the impeller, producing suction near the center, due to the throwing off of these slugs of air. Going to this picture, which is larger and I think, therefore, a little better, we have the pressure set up here of, let us say, minus two units; that is, two units below the atmosphere. As we go down here, we have to get into a region of higher pressure to overcome this friction, and at the time we reach this bottom we are at a pressure, let us say, minus one-half unit, or one-half unit below atmosphere, and going through the holes, we are at atmospheric pressure; so that throughout this column, the pressure gradually gets lower and lower and lower, so that by the time we come to the impeller, we have the lowest pressure within that chamber.

[fol. 303] By the Court:

Q. You mean directly underneath the impeller?

A. Yes, sir, directly, and also that same pressure, or pressure slightly different, because of the passages, would be set up on the top of this impeller. Thus we have here, due to the throwing off of these slugs, we have set up here a region of low pressure. The same thing would happen in the water, and this would be the impeller, if put in the proper casing, of a very poor centrifugal pump, and no matter whether you worked it right-handed or left-handed, those slugs would be sent off, and as soon as they are, some other fluid must be put in.

Q. What is the effect of that hole at the bottom?

A. The shaft goes through here.

Q. Is that the upper part or the lower part?

A. This is, I think, the upper part. I do not know exactly how it works. Have you the catalog?

Mr. Toulmin, Sr.: That is the upper.

The Witness: No matter whether it is one one side or the other, it is in the region——

Q. That hole does not go through there?

A. Yes, there is an opening both below and above, your Honor. You see, in the little model here, there is the lower side, and the piece right here is the upper side, so there is an opening on each side, and in this case, the air is sucked up from the air chamber through this end one, flows over and in.

Q. That goes out through the sides? A. And then it is drawn out to the side.

[fol. 304] Q. What is the effect of that hole in the middle underneath the impeller?

A. That sucks from the lower side——

Mr. Toulmin, Jr.: Let me ask a question, your Honor.

By Mr. Toulmin, Jr.:

Q. Dr. Greene, with this impeller, where does the impeller get its air supply? That is, does it get it at one side, or both sides simultaneously?

A. It does get it both sides simultaneously, but each side is connected to the egg chamber at the top.

Q. And one side communicates with the center of the top of the egg chamber, that is, the lower side, and the top side of the impeller communicates with the ends of the egg chambers, is that correct?

A. That is correct, I would like to mark, for your Honor's future reference, the vertical longitudinal section, in which I will place arrows, coming up on the extreme right, which I letter "A", and on the extreme left, which I will letter "B", showing the air flow into the opening at the center of the top plate, and then I will put in arrow "C" and arrow "D" to show the air coming from the egg chamber into the lower part of the impeller.

By the Court:

Q. This point to which you have directed this arrow here, is there an opening here right underneath these pans, right underneath the impeller?

A. Yes. You will notice it is not cross-hatched, and right on this side, through there, is not cross-hatched.

Q. You have arrows through this hole?

[fol. 305] A. That is a shaft, and usually that is closed over, although, were it not closed over, it would only suck air out of the egg chamber and would not do any damage.

Q. You say that is drawn in?

A. It is drown in; it is induced draft.

Q. Through the upper part of the impeller?

A. Yes.

Q. And goes out the other way?

A. Goes out the middle, between the two plates, into the square box which receives the slugs of air as they are driven off.

Q. I see what you are describing.

A. Now, I would like to call the attention of the Court to the fact that in this vertical cross-section of the defendants' incubator, the outlet for the foul air is marked "X" by me, and it is beyond the water pan and beyond the heating coils in this chamber in which the impeller operates, which is under high pressure, showing very clearly that the outlet for the foul air could not be in the egg chamber, which is a sub-atmospheric place.

In other words, James, in this little model, takes this place of higher pressure produced by the impeller, and takes his air out. He does not have an outlet for foul air in his egg chamber. The only openings to the atmosphere in the egg chamber are those openings for suction at the bottom. And so, in all of the claims which Mr. Smith makes, he says—I would like to read one of them only—he says, your Honor, "Arranging them at different levels in a closed chamber having restricted openings of sufficient capacity for the escape of foul air." That is in Smith, 28. At this point——

Q. Does he say they are in the egg chamber?

[fol. 306] A. In the egg chamber, and he claims it to be in the egg chamber, but in the James device, the exit or the exhaust is not in the egg chamber, but is in a place of entirely different pressure.

Q. Would that be material?

A. It would mean that, through the smaller hole, you could get a larger quantity of air, because the pressure is higher.

Q. You mean, in the James Way?

A. In the James Way, yes, sir, and it would have that effect, because it is in a place of high pressure, whereas, in Smith, the pressure at the top of this egg chamber is above the atmosphere, but very slightly above it, as can be shown by tests which we hope to show you; but in the James

machine, the air is thrown off after it passes through this place.

Q. Now, of course, as an engineer, the James machine is not a machine to keep in heat, because it discharges its hottest air, and it also does not conserve moisture, because it discharges its wettest air. That is, here you have the air which has just been moistened, which has just been heated, and then, because of the arrangement, it is a mechanical purpose and the manufacturer is willing to say, "I will do it this way for convenience," and he puts his outlet at this particular point.

Q. With loss of heat?

A. I think he loses more heat that way than he would the other, yes, sir, because in the Smith machine he takes it after the biological heat has been given to the colder eggs.

By Mr. Toulmin, Jr.:

Q. And, Dr. Greene, in that case you say that they discharge more moisture? Is that what you say, in the James [fol. 307] machine?

A. I should say so, yes, sir.

Q. Is there any necessity, in the James machine, for conserving moisture, in view of the fact that you do not have the last three days of hatching the eggs?

A. There is not.

By the Court:

Q. What do you call this air feed space there between the floor and the racks?

A. This is the device in here; this is the channel, and in the back you have to have the same thing. It is shown right down there. That is the door.

Q. I understand that.

A. You have to have them on each side.

Q. The door comes up tight to the racks?

A. Yes, sir. That forms the front. Now, you also utilize the rear the same way, as Mr. Taggart showed us yesterday.

Q. How about this side here?

A. That is merely this other passage here, in this view; that is merely this passage to let air get out from the chamber in here. Now, in ordinary construction, there is no double—it is only in the egg chamber—there is no double

wall here, when you use these in sections, but when you get to the upper end, you do have an air chamber in which certain devices are placed.

Q. Do they fit tight together, rack to rack?

A. Yes, sir, and they are made so that a man, when he makes a little money, can enlarge——

Q. It is a little deceiving here.

A. That is merely because of the distance between the cleats. That is, this would represent the vertical post on which the cleats are placed, and these are the edges of the [fol. 308] tray racks, do you see, in cross-section.

Q. Well, your theory or explanation of it is that the air is reversed in its order of transmission, then?

A. Well, the air in this machine is sucked upward rather than forced upward, but the egg arrangement is immaterial. That is, the eggs can be sandwiched, as it was called, or arranged in any order; many, many thousand different arrangements. No one is better than the other but in all of them, the heat which the eggs give up is not maintained in that churning around, because more must leave through the waste air, even with the very little air left out, and also by the humidity which is allowed to get out, than these eggs give.

Q. Well, if this impeller does not have any driving force, so far as the air is concerned, that is, forcing the air, what is it that causes the circulation?

A. Your Honor, I did not say there was not driving force. I said there was not an efficient one, and I would not dare call that a fan. That is, no matter what you put around this or how you control it, if you rotate that, and put liquid, water or air between, that is going to be sent out.

By Mr. Toulmin, Jr.:

Q. Let me ask you a question, Dr. Greene, which I think will answer what is in his Honor's mind: when this impeller is rotated, it throws out air, and that air travels over the heating pipes and water-pans down to the bottom of the egg chamber; that is correct, is it not?

A. That is correct.

[fol. 309] By the Court:

Q. What drives the air down to the bottom of the chambers?

A. The centrifugal force of this rotating—that is, you get your fluid rotating and it builds up what we engineers call a centrifugal force, a centrifugal pressure. Your Honor, if your take a bucket of water and pour a little around, you would find the water raised up along the edge and formed a parabola, due to that same effect we have in this device.

Q. The impeller forces the air down to the bottom of the racks?

A. In this James machine, he needs about 860 revolutions per minute for this design to get the air that he thinks we should circulate in the incubator.

By Mr. Toulmin, Jr.:

Q. After the air gets down to the bottom of these air passageways on front and back of the egg chamber, what happens to the air that is so delivered? Does it remain under pressure or does it convert over into suction, due to the impeller action?

A. By the time the air reaches the bottom of the channels in the front and back of the incubator, it is my belief that most of its pressure has been used up in friction and possibly speeding up the air to a place of lower pressure, so that when it is turned around at right angles and delivered from the two sides toward the middle, where it meets this rotating stirrer which tries to move it in the other direction, and with the openings from the outside air into this same place, which is now of low pressure, produced by the impeller, we have a mixing as has been described by Mr. Taggart.

[fol. 310] Q. All right; stop right there, Doctor. That is the second phase of the operation. Now, the third phase is the upward movement, which I understand is due to the induced action and suction of the impeller on the last half of the movement?

A. Yes.

By the Court:

Q. Well, would not that impeller tend to drive the air back up through the channels through which it came?

A. The stirrer?

Q. The stirrer; would not that tend to drive the air back up through the channels through which it came, as well as up through here?

A. It is moving at a slow rate, your Honor. Mr. Taggart has made tests, which he reported or testified to today, in which he finds very little velocity after you get up to several of these trays, and up at the top there is no velocity, in his anemometer.

By Mr. Toulmin, Jr.:

Q. Top of what, Doctor?

A. In the top of the tray chamber.

Q. You are not referring to the passageways?

A. No.

Q. You are referring to the egg chambers?

A. In the tray chambers. Now, he said, in his testimony, that there may have been some air driven up through the passages, front and back. I noted on the machine over there that he had provisions for introducing into that glass chamber a small anemometer. Now, he never used that, for some reason. I do not know what it was or why he [fol. 311] did not, but he said he never took readings in the channels while the stirrer was moving, but were there a discharge of the air up through that channel when the impeller is not running, but when the stirrer is, that air which is discharged up at the top ought to have returned back through the eye of the impeller and given a downward reading, in those upper anemometers; and since there was no reading there, I take it that there was no discharge upward.

The impeller or stirrer rotating does have a tendency to do the very thing which you said, namely, to push it out, because that acts as a stirrer and centrifugal force would tend to make the air flow up; it will meet this incoming air and stir it up, and mix it, so that you do get this discharge upward through the egg chamber.

Q. Now, Doctor, as I understand it, the air that is coming down from the passageways on either side is coming from the impeller; the air at the bottom, being engaged by the stirrer, is being thrown out in a direction exactly opposite to that of the incoming air from the passageways?

A. Right.

Q. And that results in mixing?

A. Right.

Q. Now, if the air in the egg chamber were under pressure, would it be possible to bring in any cold air through the cold air openings in the bottom of the egg chamber?

A. No, indeed.

Q. Because, if air in the egg chamber were under pressure, it would blow the air out of the openings instead of taking the cold air in, is that right?

A. That's right.

Q. Further, the air must be under suction in the egg chamber?

A. Yes.

[fol. 312] Q. Now, what is the effect, to conclude this subject, of this four-arm flat-bladed stirrer that rotates about two hundred twenty revolutions per minute, in the bottom of each one of these egg chambers?

A. Its effect, as its name indicates, is to stir up this air to take the flow, not from one passage, or corridor, or duct, but from two opposing ones, driving a single high velocity up through the middle, which would occur if that impeller did not operate. Also it tends to take the cold air which is coming in and mix it, through the discharge of the warm air, to prevent these cold spots which were spoken of today by Mr. Taggart.

Q. And what draws the cold air in?

A. The low pressure within this lower part of the egg chamber.

Q. Being lower than atmospheric pressure?

A. Absolutely.

Q. If you did not have the impeller, would you have hot streaks and cold streaks, due to the four streams of cold air and two streams of hot air coming into the bottom of this chamber?

A. Yes, you would.

Q. And what instrumentality is it that James uses to prevent these hot and cold streaks?

A. A stirrer or turbulator.

Q. And after the air leaves the region above the turbulator, the stirrer in the bottom, or air mixer, is there anything else to work upon the air, of a mechanical nature, until it rises by suction and goes into the eye of the impeller again?

A. There is nothing. I would like to call attention to the fact, however, that in Mr. Taggart's tests, the velocities indicated by the anemometers placed above each other gave [fol. 313] varying velocities, which, in my mind, indicates that the velocity through anyone of the vertical passages formed, if you look down, or the velocity along a diagonal passage as you could look through, is not uniform, and to my mind, there must be a spill backward and forward throughout the egg chamber to cause these differences in velocities, one over the other.

There is also, as he called to the attention of the Court at the test made yesterday, certain dead spots which indicate that the air is not flowing in that direction, in those locations, in a vertical direction.

Q. Let me ask you a question right there: This series of readings that were taken before his Honor yesterday at the test, where there was substantially zero at the bottom, and then 136 about the middle, and 145 at the top, in the James egg chamber, would that indicate to you that you were proceeding from a position whether the air at the bottom of the egg chamber was about stationary, to a point at the top where it was moving at some degree of speed, due to the suction action of the impeller? Is that a correct interpretation?

A. The whole thing is due to the suction, but the change in velocity, to my mind, is due to the fact that there are, in these single lines of velocity, currents of velocity through this egg chamber; that is, when we have a drop in pressure in the air stream, there is practically no difference in velocity, if the passage is of unform cross-section, because as much material goes in at one end as comes out the other.

Now, it is true that, as you get further along into [fol. 314] regions of lower pressure, the air expands a slight amount, but it would not account for the difference in velocity shown here. That is, these differences in velocities, to me, indicate the lack of individual lanes of currents; that is, there is fluctuation.

The Court: I think we had better stop at this point.

(Proceedings adjourned to Friday morning, February 2, 1934, 10 o'clock.)

ARTHUR M. GREENE, continued on behalf of defendants, testified as follows:

Mr. Toulmin, Jr.: Before I start with Dr. Greene, I think I had better clean up this exhibit situation so as to get it in an orderly fashion. In the preliminary injunction nineteen exhibits were offered in court and marked here. I will re-offer those in order that the record may be perfectly clear that we had offered them, and that will save duplication of any further exhibits on that subject.

Mr. Ely: I wish to object to the receipt of those in evidence until I have a chance to refresh myself on what they were, and I want particularly to object to that sheet which was said to allege defendants' construction not found to infringe. I want to object to that as not proper proof. You will recall that sheet.

[fol. 315] The Court: You had better let Counsel look over it and then they had better be re-introduced.

Mr. Ely: There are a lot of affidavits. I object to those, too, your Honor.

The Court: He is not offering the affidavits.

Mr. Toulmin, Jr.: They are all marked. They have got a serial number. We have a right to refer to them anyhow in case anything should come up, because they are of record in this court, but it makes an orderly process of keeping track of the numbers, that is all.

The Court: There may be some of them that you want to refer to now, and they may be held until Counsel has a chance to examine them. I understand that the affidavits on the preliminary injunction should be considered as part of the record here.

Mr. Toulmin, Jr.: Yes, your Honor, because of the statements of operation there by Mr. Taggart that we want to reply upon which we think is valuable in connection with this case.

The Court: I thought you meant in their entirety.

Mr. Ely: They are here. There is the affidavit of Dr. Greene and others. And, of course, I want to make very plain my objection to Exhibits 18-A, B and C, three drawings showing the internal construction of various parts. I want to object to 19, the chart showing the various types of construction which have been held by the District Court [fol. 316] and the Court of Appeals as non-infringing, and

a quotation printed at the bottom of the Court's opinion I object to that for two reasons. I think first, because they have not been proven, and I object secondly to picking out certain isolated sentences, picking them out of the opinion.

The Court: In view of the examination already had, I do not see any harm in it being received.

Mr. Ely: I object to it being received as labeled "Defendants' construction held not to infringe".

The Court: Of course, that is only the conclusion of the draftsman.

Mr. Ely: It gets in the record under that heading, and Counsel refers to that as "this is the defendants' construction not held to infringe". I object to it going in in that fashion.

Mr. Toulmin, Jr.: We can interpolate that in the title.

The Court: The Court is going to consider this drawing with the evidence in mind.

Mr. Ely: The primary thing I object to is the illustration of some incubators or some constructions that are under the heading "defendants' construction not held to infringe". That gets in the record and gets to the Court of Appeals, and the Court of Appeals looks at that and says "Here is the defendants' construction not held to infringe". That is not proven anyhow.

[fol. 317] The Court: Haven't you a corresponding drawing here——

Mr. Ely: Yes, we had a witness that testified as to the fact that those were the constructions that were held to infringe. We had a witness that was present at the time of the trial.

The Court: I assume that there will be a proper foundation laid for it.

Mr. Toulmin, Jr.: Mr. Taggart admitted most of those constructions are correct. I am going to supplement it, but I would like to have them marked.

The Court: We will hold the reception of that document at this time. Of course, as pointed out by Counsel, there should be a statement of someone that that is the one.

Mr. Toulmin, Jr.: We already had that from Mr. Taggart. He identified three of those. He identified the Petersime. He identified the Hillpot experimental one, as he called it, and he identified the Blum—that is the Bundy,

and he said he could not identify the Boling, and that led to a long discussion about Boling.

The Court: Do you question those three drawings as being the drawings that were construed in those cases?

Mr. Ely: Yes, your Honor. There is one drawing under the Blum heading which is wrong. Those three drawings under the Boling heading, they are all wrong, and the Hillpot drawing is apparently a drawing of an experimental machine, which, as I understand it, was not the machine [fol. 318] that was in suit, simply a machine which Mr. Hill testified that he had experimented with, and the fact that that drawing is in the record of the Hillpot case, does not say that that drawing shows the thing that was up for decision.

May I mark what we object to? We object to this one (indicating).

Mr. Toulmin, Jr.: Don't mark them. State what you object to.

Mr. Ely: All right. I object to the third drawing in the column headed "Smith vs. Blum". I object to all the drawings in the column headed "Smith vs. Boling". And I object to all the drawings in the column headed "Smith vs. Hillpot".

Mr. Toulmin, Jr.: I think that that merely goes to the weight of this.

The Court: Also the record should be made as clear as can be. Take this Hillpot exhibit or diagram. If that does not represent the drawing of the machine that was passed upon by the Court, I do not think we ought to have it here as representing such.

Mr. Toulmin, Jr.: I will ask Dr. Greene about this right now, as long as this question is raised.

The Court: All right.

Mr. Toulmin, Jr.: I offer in evidence a certified copy of the record of Buckeye and Smith vs. Petersime, and a certified copy of the briefs that were filed in that case, all in the Court of Appeals, the record showing the record in the [fol. 319] District Court, of course, as Defendants' Exhibit 30.

(Certified copy of record and briefs in Buckeye and Smith vs. Petersime in Court of Appeals, marked Defendants' Exhibit 30.)

Mr. Ely: I object to Dr. Greene testifying on the record.

Mr. Toulmin, Jr.: You wait until I get the testimony and then you can put your objection in.

I offer in evidence the record of Buckeye and Smith vs. Boling in the Court of Appeals for the Sixth Circuit, which contains the illustrations on the Indiana case upon which the Court framed its judgment, and the photographs of that installation, and also contains the testimony in the Indiana case. This is a certified copy from the Court of Appeals for the Sixth Circuit, so that we can get the Indiana testimony this way. That is offered as our Exhibit No. 31.

(Certified copy of record of Buckeye and Smith vs. Boling in the Court of Appeals for the Sixth Circuit, marked Defendants' Exhibit 31.)

Mr. Toulmin, Jr.: And I offer in evidence the record of the Court of Appeals for the Sixth Circuit, of Buckeye and Smith vs. Blum, a certified copy, as our Exhibit No. 32.

(Certified copy of record of Court of Appeals for the Sixth Circuit, in Buckeye and Smith vs. Blum, marked Defendants' Exhibit No. 32.)

[fol. 320] By Mr. Toulmin, Jr.:

Q. Dr. Greene, have you examined the record in the case of Smith vs. Petersime in the Sixth Circuit, known in this record as Defendants' Exhibit No. 30?

A. I have.

Q. With special reference to the defendants' construction in issue in that case?

A. Yes.

Q. Will you look at the chart marked Defendants' Exhibit 19—I will use that number until we have the formal offer—and look at the left-hand view, and state whether that is a correct illustration of the defendants' construction as you understand that record?

Mr. Ely: I object to that, your Honor. The record is there, and I do not see what the object is of having Dr. Greene testify as to what the record shows. Furthermore, there is no objection to the showing of the Petersime. That Petersime is correct.

Mr. Toulmin, Jr.: I am proving 19 now. If I don't prove it all, you can object again.

The Court: I will sustain the objection. I think that is a matter for the Court to say on this record whether it describes it or not.

Mr. Toulmin, Jr.: The same objection occurred to their Exhibit 27.

The Court: Counsel stipulates that there is no question about this Petersime drawing.

Mr. Toulmin, Jr.: If that is the case, we will pass to the [fol. 321] next drawing. I raise no objection to 27, because I think it is helpful to the Court to get as much short cuts on these constructions as possible and save your wading through.

Q. Dr. Greene, have you examined the construction shown in the second line of illustrations under the title of "Smith vs. Blum", and have you likewise read the record on the subject of defendants' construction in the Smith vs. Blum record, Exhibit No. 32?

A. I have.

Mr. Ely: I object to the question, your Honor, as incompetent and improper.

The Court: Well, it is preliminary—this question.

Q. Will you state whether or not the construction shown on Exhibit No. 19 under the Blum title is a correct duplication of the construction shown as of the defendant in that record?

Mr. Ely: I object t the question, your Honor.

The Court: The question of whether that is a device shown in the patent proceedings is one thing. The question of whether it is a drawing of the patent that was involved, is another. That was passed upon——

Mr. Toulmin, Jr.: You mean the defendants' construction that was passed upon?

The Court: Yes, that is what I mean. It might be used in the record for some other purpose. The question is what was the claim. Under the patent- that were determined in that case.

Mr. Toulmin, Jr.: Now I am asking him if that construc- [fol. 322] tion shown on Exhibit 19 is a correct illustration

of the construction that was in issue according to that record? Therefore, when you look at that 19 you will know that that is a correct duplication of it.

Mr. Ely: There are three constructions shown under that Blum heading.

Mr. Toulmin, Jr.: And they are all shown in the record.

Mr. Ely: We are making no objection to the top two. The top two are correct, but the third one is wrong.

Mr. Toulmin, Jr.: Now, if your Honor will look at the third one, and this illustration (indicating), you will see that there is a duplication.

Mr. Ely: What is that illustration?

Mr. Toulmin, Jr.: That illustration is of the defendants' construction.

The Court: In what respect do you claim that this is in error?

Mr. Ely: We claim it is in error in the fact that these blades are set at an angle, your Honor. This is a correct construction (indicating).

Mr. Toulmin, Jr.: These are set at an angle (indicating).

The Court: You claim that these are straight up and up?

Mr. Ely: Yes, this is the way that the blades were (indicating), as you will see from what Judge Westenhaver said. I think the vice of the whole thing is that you have got a man testifying here that was not at the trial and does [fol. 323] not know what the construction was that was involved. I think the record speaks for itself.

The Court: Of course, we are presented here with something by way of comparison. I do not think that I could accept the conclusion of the witness on that subject. The Court itself will have to say from an examination.

Mr. Toulmin, Jr.: Very well, your Honor. I was hoping to save that by a short-cut. If you feel that way——

The Court: It is not for him to conclude from this whole record whether such and such was the case. We can get the facts from the record itself. Objection sustained.

Mr. Toulmin, Jr.: Exception, please, with your Honor's permission.

Q. Now, Dr. Greene, have you examined the illustrations under the title of Smith vs. Boling in the Indiana court, the third group of illustrations, and also have you examined the Buckeye vs. Boling record, Exhibit No. 31, and particularly the testimony reproduced therein, and illus-

trations relative to the Indiana suit, to see if those illustrations are correct illustrations?

Mr. Ely: I object to the question, particularly the last part of the question, your Honor. The last part of the question was whether those were correct. I object to the latter part of the question for the same reason the Court sustained the same as before.

[fol. 324] Mr. Toulmin, Jr.: Exception, if the Court please.

The Court: The Court will take the record there and examine it and see just what the determination was.

Mr. Toulmin, Jr.: Exception. We now tender this Exhibit 19 formally, so that we can preserve our record.

The Court: Yes.

Mr. Toulmin, Jr.: We ask that it be marked for identification under Rule 46, as our Exhibit 19 for identification.

(Illustration marked Defendants' Exhibit 19 for Identification.)

Mr. Toulmin, Jr.: The night before last, your Honor, Dr. Greene was referring to this illustration of the defendants' construction (indicating). I think we ought to have that in. We offer this illustration in evidence as our Exhibit No. 33.

(Illustration of defendants' construction marked Defendants' Exhibit No. 33.)

Mr. Toulmin, Jr.: We offer this vertical cross-section of the defendants' incubator as our Exhibit 34.

Vertical cross-section of defendants' incubator marked Defendants' Exhibit No. 34.)

Mr. Toulmin, Jr.: We offer in evidence the catalogs of the plaintiff as submitted here by the plaintiff in response to our request when we exchanged catalogs and instruction sheets. These catalogs consist of the Smith catalog Type No. 47, Smith catalog entitled "Smith's 52,000" and "Smith's Service", a catalog entitled "The New Smith [fol. 325] 52,000 Electric", and the new Junior 30,000 catalog; catalog entitled "Hatchery Opportunities", and operating instruction book for the steam-heated Smith Incubator, and the operating instruction book for the electric-heated Smith Incubator.

The Court: They are all attached, are they not?

Mr. Toulmin, Jr.: Yes, that is a single exhibit.

The Court: All right.

Mr. Toulmin, Jr.: They are offered as our Exhibit No. 35.

(Several catalogs of plaintiff marked Defendants' Exhibit No. 35.)

Mr. Toulmin, Jr.: We offer in evidence the document entitled "Separate Hatchers" which is a sales document admitted by the plaintiff to have been sent out to the trade in connection with this subject-matter in response to our motion for production of papers and admissions of documents, and ask that those be marked as Exhibit 36.

(Document entitled "Separate Hatchers" marked Defendants' Exhibit No. 36.)

Mr. Toulmin, Jr.: We offer in evidence a circular of the plaintiff company on the subject of separate hatchers and their incubators, entitled—I will be unable to give the title, your Honor. I offer that as Exhibit No. 37.

(Circular of plaintiff company on the subject of separate [fol. 326] hatchers and their incubators, marked Defendants' Exhibit No. 37.)

Mr. Toulmin, Jr.: We offer a second circular of the Smith Company on the same subject, of a different character, as No. 38.

(Second circular of the Smith Company on same subject, marked Defendants' Exhibit No. 38.)

Mr. Toulmin, Jr.: We offer in evidence the circular letter to the trade of the Smith Incubator Company under date of October, 1930; that is also on the question of the spread of disease in separate hatchers. That is offered as our Exhibit No. 39.

(Circular letter of the Smith Incubator Company, dated October, 1930, on question of spread of disease in separate hatchers, marked Defendants' Exhibit No. 39.)

Mr. Toulmin, Jr.: We offer in evidence the service bulletins 1 to 100 of the Smith Incubator Company as our Exhibit No. 40.

(Service Bulletins 1 to 100 of Smith Incubator Company marked Defendants' Exhibit No. 40.)

Mr. Toulmin, Jr.: We offer in evidence the Smith Incubator Catalog F Type 40-47. I find no date on it. That is offered as our Exhibit No. 41.

(Smith Incubator Catalog F Type 40-47, marked Defendants' Exhibit No. 41.)

Mr. Toulmin, Jr.: We offer the Smith House Organ called "Smith's Chickograms" of January, 1932, Volume 7, No. 1, as our Exhibit No. 42.

[fol. 327] ("Smith's Chickograms" of January, 1932, Volume 7, No. 1, marked Defendants' Exhibit No. 42.)

Mr. Toulmin, Jr.: We offer in evidence the copy of the contract between Smith and Buckeye, with particualr reference to the separate hatcher question, which has been produced here by the plaintiff in response to our request, as our Exhibit No. 43.

(Copy of contract between Smith and Buckeye, with reference to separate hatcher question, marked Defendants' Exhibit No. 43.)

Mr. Toulmin, Jr.: We offer in evidence the Buckeye letter of June 30, 1931, with attached illustrations of the Buckeye separate hatcher, as our Exhibit No. 44.

Mr. Ely: I will reserve my objection until I know what this is about. I wish to note, however, that any statements made in there are not binding on the plaintiff.

The Court: You refer to the letter? Is that the letter or the contract?

Mr. Ely: No, the contract is all right, but I state that we are not bound by any statements made by the Buckeye Incubator Company in their catalog or in this letter, and with that reservation, it may be received.

(Buckeye letter of June 30, 1931, with attached illustrations of the Buckeye separate hatcher, marked Defendants' Exhibit No. 44.)

[fol. 328] Mr. Toulmin, Jr.: We offer in evidence the Buckeye Catalog which illustrates both the incubators and the separate hatchers, that catalog being known as Catalog Copyright 1932. We offer that as our Exhibit No. 45.

Mr. Ely: With the same reservation, your Honor, as not binding on the plaintiff.

(Buckeye Catalog Copyright 1932, illustrating both incubators and separate hatchers, marked Defendants' Exhibit No. 45.)

Mr. Toulmin, Jr.: On the preliminary injunction we offered in the volume of the prior art, which I take it is in now. In addition to that we gave notice that we relied upon the evidence that was in the file wrapper, a patent of Goldstein No. 1,137,752. We offer that as our Exhibit No. 46.

(File wrapper of patent of Goldstein No. 1,137,752, marked Defendants' Exhibit No. 46.)

Mr. Toulmin, Jr.: For the purpose of the state of the art, we offer Wood's Patent No. 656,760, as our Exhibit No. 47.

(Wood's Patent No. 656,760 marked Defendants' Exhibit No. 47.)

Mr. Toulmin, Jr.: Now, your Honor, several times here we have mentioned the case of Jones vs. Cyphers. That was decided in this Court by one of your predecessors, and afterwards went to the Court of Appeals. We offer that on the subject of incubators and the question of analogous art. I have here the prior art, which was set up in that [fol. 329] case, and I desire to offer it as a single exhibit, not for the purpose of anticipation but to illustrate what was in that case. That is offered as our Exhibit No. 48.

Mr. Ely: I object to that. I object to loading up the record with a lot of things here which we have not seen. We do not know what they are.

The Court: I will give you the opportunity to examine it, Mr. Ely. I will give you ample time to do that. I will withhold reception of them until you have examined them.

Mr. Toulmin, Jr.: Suppose we mark this for identification.

The Court: Yes.

(Case of Jones vs. Cyphers marked Defendants' Exhibit 48 for Indentification.)

Mr. Toulmin, Jr.: I think your Honor inquired the other day about whether we had any patents of our own. We have under which we are operating. We also own another patent. I have here in a single volume the following patents

which I am going to offer as a single exhibit, to wit, Fullington 1,205,445; filed September 18, 1914, patented November 21, 1916, which is owned, and I will prove the ownership later by the defendant; the patent of James L. Nix, No. 1,548,478, filed January 28, 1924, issued August 4, 1925, which is owned by the defendant, and I will prove it in due course by witnesses; the patent 1,751,093 of George Markey, filed February 6, 1926, and issued March 18, 1930. This [fol. 330] patent has to do mainly with the separate hatchers and noted on its face as being assigned to the James Manufacturing Company. I will prove it more formally later, if necessary. The patent to G. T. Markey, No. 1,796,872 of March 17, 1931, which deals with the egg tray racks, which is assigned on its face to the James Manufacturing Company. The patent of G. T. Markey, No. 1,837,458 of December 22, 1931, which is assigned to the James Manufacturing Company, and the patent No. 1,939,908 of G. T. Markey, issued December 19, 1933, and assigned on its face to the James Manufacturing Company, which is our basic patent under which we operate on our incubator. I offer these as a separate exhibit, to be known as our Exhibit No. 49.

Mr. Ely: I object to the receipt in evidence of all the patents, in that folder except the Fullington patent, which is prior to the Smith, but the others are all later patents, and I do not see where they have any bearing at all upon the question of either validity or infringement.

Mr. Toulmin, Jr.: They have a vital bearing. It has been the doctrine, particularly in the court of this circuit for a great many years—I have the authorities here—that patents have been taken where he operates under those patents, and I propose to have Dr. Greene so identify it before he gets through, and the other witness, and particularly the main patents under which it is operating, being prosecuted [fol. 331] in the Patent Office, had the patent in suit submitted to the Patent Office as a basis for rejection, and over that patent in suit the defendant's patent was allowed, and the distinction was drawn between the two structures by the Patent Office, and there came a decision of the Patent Office that the courts recognized as a vital factor on the question of infringement.

I will now cite to your Honor the authorities if you care to hear them at this time.

The Court: You have not given the proof as yet.

Mr. Toulmin, Jr.: Not yet. But I have to mark it first before I get down to my detailed proof.

The Court: Mark it for identification.

Mr. Toulmin, Jr.: I will renew the offer later after you hear the proof.

(Folder of patents owned by defendants marked Defendants' Exhibit No. 49 for Identification.)

Mr. Toulmin, Jr.: They are not offered as to our patents, other than the Fullington, except on the question of anticipation.

The Court: It is your claim, as I understand, that because the Patent Office approves a patent application, you claim that that act of the Patent Office is evidence of non-infringement?

Mr. Toulmin, Jr.: Yes, it is a presumption of non-infringement.

The Court: Made subsequent to the issuing of the patent in question.

[fol. 332] Mr. Ely: May I just read a syllabus from a decision just hot off the griddle in the Eastern District, that defendants' structure is covered by another patent does not support a claim of non-infringement. (Reading from syllabus.) That is from Judge Moskowitz.

Mr. Toulmin, Jr.: That is an exception to the rule. The real rule as drawn by this Circuit——

The Court: I wish before the matter is disposed of you will call my attention to your cases on the question. Of course it is important.

Mr. Toulmin, Jr.: Yes, it is vitally important to this defendant's interests.

Mr. Ely: Before you get any further, make a note that the case to which I refer of Judge Moskowitz is Berger Brothers vs. Whitney Metal Products Company, and it is reported in United States Patents Quarterly, Vol. 20, page 96.

Mr. Toulmin, Jr.: My authorities are coming over now from Mr. Powers' Office.

The Court: Well, proceed with the witness and we can take it up later.

By Mr. Toulmin, Jr.:

Q. Now, Dr. Greene, will you be kind enough to turn to the group of patents in Defendants' Exhibit No. 49 for Identification, and in particular to the last patent in the group, No. 1,939,908, and state to the Court whether you have examined that patent in connection with the defendants' construction now in issue here as illustrated by such illustrations as Defendants' Exhibits 33 and 34, and com-
[fol. 333] pare the two together. Have you done so?

A. I have read this patent to Markey, your Honor, No. 1,939,908, and the description and mode of operation are substantially the same. In fact, the description of this machine in the patent could be used in explanation of the action of the James machine, as it is in detail and in action identical with this—I would rather say not in detail, but in action, it is identical with the James machine which I have described.

Q. Have you examined one of the James' machines itself, such as the one that we saw in Mr. Ely's exhibit of the Smith Company the other day?

A. I have examined a number of James' machines.

Q. Will you please answer the same question in connection with that patent and the actual machines themselves?

A. Yes, sir.

Q. What is your answer? Are they alike or are they different?

A. They are alike.

Q. Do you find any addition or change in the actual machine that is not shown in that patent?

A. Yes, I do.

Q. Call attention to anything that you see, no matter how detailed, which may be different.

A. Please repeat the question.

Q. I will repeat it for you. Call attention to any difference between this patent and the actual machine which you observed, no matter how detailed that change may be.

Mr. Ely: I object to that. I do not see the purpose of that. We are not suing them on the patent. We are suing them on the structures down in the warehouse.

[fol. 334] The Court: Objection overruled.

Mr. Ely: Exception:

A. Your Honor, I would like to describe the machine from Fig. 3 on the second page of drawings.

Q. To shorten it, merely call attention to any differences between this and the actual machine, because his Honor is already familiar with our defendants' machine.

A. You will notice that the impeller has blades which are not plane, but are bent. You will note at the bottom the stirrer does not have radial blades, but straight blades. You will note a spring 74 for the purpose of keeping the belt tight on the stirrer, and you will find at the top of Fig. 3 openings, 76 and 77. The opening 77 is identical with the one in James' actual machine. It is controlled in the same way. The opening 76 is not present in the James machine, but is replaced by four openings under the impeller.

The Court: One is at the top and the other is at the bottom of the machine?

A. The openings for the cold air, the fresh air, in this machine, are at the top, but into the place of low pressure, however. Those are the only differences.

Q. In the defendants' actual machine it also has one of those top openings, has it not?

A. Oh, yes, I said 76 was identical with the one——

Q. And in addition to the air opening at the top in the defendants' machine, the defendants' machine as built, has these four openings between the bottom air stir-up or air mixer? Is that correct?

A. Yes.

[fol. 335] The Court: In the defendants' machine, the opening at the top is the exhaust?

A. No, your Honor. It has an opening which has a thermostatic control and allows extra cold air to come in should it get too hot.

The Court: And the defendants' machine——

A. The defendants' machine at the top has a thermostatically controlled valve which is normally out of operation, and this one (indicating) 77 in this patent, is normally out of operation. That is what Markey has done is to take his fresh air in through the opening 76 which is always open. The James Company has taken this opening 76 from

the top into the lower part of the egg chamber, and in place of a single one it has placed those under each of the impellers.

By Mr. Toulmin, Jr.:

Q. Now, Dr. Greene, let me ask you one more question. You have mentioned the fact that the impeller at the top in the Markey patent No. 1,939,908, has curved blades. I call your attention to the next patent of Markey, No. 1,837,458, and will ask you to state whether you find there the impeller as actually used in the defendants' machine with straight blades?

A. That is similar to that used by the defendant with radial blades. In Fig. 3 the impeller is shown with the radial flat blades.

The Court: That is the same as this impeller here (indicating)?

[fol. 336] Mr. Toulmin, Jr.: Yes, your Honor. I better offer that in evidence right now. I offer in evidence the impeller of the defendants' machine as our Exhibit No. 50.

(Impeller of defendants' machine marked Defendants' Exhibit No. 50.)

Q. This last patent you referred to shows the impeller such as in evidence No. 50?

A. Yes, sir.

Q. Now, Dr. Greene, if we will return to where we were when we left off, on Wednesday night, will you continue in further explanation of the operation of the defendants' machine in order to complete that explanation?

A. I would like to point out to the Court, as has been pointed out by the witnesses for the plaintiff, that in the James' machine when eggs have advanced to the seventeen and a half day condition, the door is opened in the front and the trays arranged in some particular order—not necessarily adjacent—are removed from the incubator and taken to the hatcher. Then, too, new trays with fresh eggs are placed in.

The Court: Placed in where?

A. Placed into the egg chambers.

The Court: Where; any particular place?

A. In the places left vacant by the removal of the trays of the seventeen and a half day eggs.

The Court: The seventeen and a half day eggs would then be at the bottom or any other location?

[fol. 337] A. They could be anywhere. One might be at the bottom and the next one might be at the middle, or they might be at the top, your Honor, as was very nicely shown in the Exhibit No. 27 by Mr. Taggart.

By Mr. Toulmn, Jr.:

Q. You are referring to this drawing of the plaintiff (showing to witness)?

A. I am referring to this drawing. In this particular drawing, had we opened the door on the seventeenth and a half day, we would have taken out the eggs from the third tray and the top one, then we would put in there two new trays; so that in the next picture he has correctly shown that the eggs in these trays, the first and the third trays, one day old. And in the first drawing showing the James Way arrangements on Exhibit No. 27, the fourteen day eggs are placed in the fourth tray from the bottom and the sixth from the bottom. These become the seventeen and a half day eggs. In the third figure they are withdrawn, and the same positions correspond to the first day eggs, if that next day were shown, but it is not shown, as the next figure is for a week later, and I just wish to bring to the attention of the Court again the fact that after allowing eggs to stay in this egg chamber in one fixed position for seventeen and a half days, the trays with eggs are then removed, taken to the hatcher, where the excessive heat given up is cared for in that separate instrumentality. This excessive heat of the last three and a half days is not found in the James incubator at all.

Q. Have you any calculation that you have made on the [fol. 338] question of whether or not in the James incubator the egg heat is carried from the top of the egg column around back to the bottom of the egg column?

A. I have made such calculations.

Q. Will you please produce it if you have done so?

A. From the chart which Mr. Taggart produced, Exhibit 3 of the plaintiff, I have added the mean ordinance for each day, which gives the amount of heat delivered by an egg for that day, I have added those up, considering the positive

and negative parts, and I find that for one thousand eggs in the James arrangement for seventeen and a half days, assuming the average over this period which is correct, we get 1,275 B. T. U. of heat delivered per thousand eggs per day.

I have then taken the amount of air delivered from the James machine and taken into the James machine, of course, with its extra humidity, and find that the discharged air contains 5,880 heat units per thousand eggs per day——

The Court: What do you mean, from the discharge there in distinction to the fresh air?

A. The fresh air is taken in at the bottom at the temperature of the room, which I have taken as 70 degrees, your Honor, and a relative humidity which we say would be forty per cent. I have then taken this hot air which goes out at the top at the James temperature of one hundred and a half degrees, with a humidity which is normally held there, and the addition of heat to the air to raise it from [fol. 339] 70 to 100½ or I took 30 degrees to make it a little easier to work out, and the additional moisture which was sent out, would account for 5,880 heat units per thousand eggs per day, showing that in the James machine more heat is removed than is given by the egg columns.

Mr. Toulmin, Jr.: We offer in evidence this tabulation as our Exhibit No. 51.

(Tabulation marked Defendants' Exhibit 51.)

Q. I thought you had covered the Smith side of the tabulation 51. Evidently you haven't. Will you now refer to Exhibit 51 and describe the operation in the Smith machine?

The Court: You say here, "egg heat at the top of the column". I thought you were referring to the average egg heat over all the eggs.

A. Exactly, your Honor. The air containing that heat goes out at the top of the column, so that we couldn't have that heat there. We have to take the average.

The Court: That is included in the discharge air of 5,880?

A. Yes, the air from the column comes up with 1,275 heat units in the eggs. It then goes over the water tray

which abstracts heat from the air, but that heat remains in the cycle, although not available for the eggs.

A little bit beyond that we come to the opening which discharges 5,880 units per thousand eggs per day, and then [fol. 340] this air goes over the water pipes to get the necessary heat, because you notice that you are removing much more heat than the eggs supply, and the rest comes from the water pipe.

The Court: It goes around again?

A. Yes, and the thing which comes around we might say is the heat from the water and not the heat from the eggs.

The Court: The heat from the water pipes?

A. Yes, which comes through the pipes from the water inside.

By Mr. Toulmin, Jr.:

Q. You have been referring to the James construction in response to his Honor's questions. Will you proceed with that answer as to the Smith side of that tabulation?

A. In looking again at Exhibit No. 27 of the defendant, we see the Smith arrangement with the hottest eggs in the hatching stage at the bottom, and the coldest eggs at the top. From Mr. Taggart's figures along the same way that I computed the others, I find that the eggs is 3,575 heat units per thousand eggs per day. In this case, however, the amount of heat removed with the air—that is delivered through port 28 of the patent, is only 3,440 heat units per thousand eggs per day, leaving a balance of 135 to go over into the return air, and that heat is more than used up by the heat going through the walls, which I have [fol. 341] not brought into this picture. The great animal heat produced in the Smith machine may account for the fact that they have to use cold water at times. If the air and water do not pick up some of this animal heat, and in this machine, your Honor, the first two numbers indicate the conservation of moisture and heat in the Smith machine.

In the James machine, 5,880 heat units are discharged, whereas in the Smith machine 3,440 are discharged. The major part of each one of those numbers—a little over a half—is due to the moisture, and in Smith there is less heat

removed by the moisture than there is in James, so that to my mind indicates that Smith is conserving moisture.

Q. May I ask a question at that point, Dr. Greene? What causes the additional heat from the eggs in the Smith machine, as indicated on the Exhibit No. 51 in your hand, as compared with the heat from the eggs in the James machine?

A. It is entirely due to the heat from the eggs—from the 17½ day to the 21st day. From Mr. Taggart's drawing, I find that 180 per cent. of heat in the first 17 days is equal to the heat going out in the last period. In other words, the Smith machine has developed in it 280 per cent. of the heat developed in the James machine by the eggs.

The Court: Supposing it has, supposing that is true, what is the difference? They both hatch the eggs, don't they?

A. The great difference, your Honor, is in the arrangement of Smith. They both hatch eggs. Smith wants to [fol. 342] transfer from his eggs all the hottest egg heat to the cold air eggs. He does that by putting the hottest eggs at the bottom where the air bathes those eggs, and carries it up for reception in the coldest eggs. He then delivers almost all of that heat through the vent 28. He says in his patent that the heat from the hotter eggs is to go to the colder eggs, and that can only be true with the arrangement which is shown in his patent and which he practices in the patent. That is the patent is absolutely right on the statement, but in no other arrangement without the hottest eggs are at the bottom and arranged in order as Smith arranges them, can you say that the heat from the hottest eggs will go to the coldest, because this is not a closed circuit. I am afraid that in the previous suits—I do not know anything about the detail of the presentation—they have not considered a great amount of heat removed through the vent 28; and in the Smith machine, since he puts his hot eggs at the bottom, his statement is absolutely right, and when he speaks of different levels, he can only practice the different levels which he has shown in order to make that statement correct.

The Court: Your point is that under the James Machine you can put these trays of eggs in any location?

A. Absolutely.

The Court: But you cannot do it under the Smith machine?

A. That is correct.

[fol. 343] The Court: They won't hatch because the hotter the eggs, those that put out the most heat, must be at the bottom, and his system of air circulation——

A. Is different. They will hatch in there. That is, they will hatch in the machine, because it is a complete machine. They will be treated for hatching in the James machine.

The Court: Supposing you put your eggs from 17½ days to 21 days up at the top in the Smith machine.

A. Then if you did that, your Honor, you would not practice the Smith patent. They would hatch, though.

The Court: Just as well as they would below?

A. I believe so.

The Court: Heat does not go down, it goes up, doesn't it?

A. Yes, but he would have to supply the necessary heat from his hot water coils in that case.

The Court: And he would get too much heat if he increased his heat below and the heat above goes out—he would get too much heat for those eggs?

A. No, because the eggs below wouldn't then be giving up that heat. They would be colder eggs below.

[fol. 344] The Court: I am speaking of those at the top. They would get their own heat and they would get the accumulation of the added heat? What would be the effect upon those eggs?

A. No. You see the hatching eggs use 64 per cent. of the total heat. And now in this arrangement which I have shown here, or which is shown by the defendant, the heat given up by the eggs goes into a column of air which is rather large, and when it goes in it changes the temperature slightly. When this heat comes through, the first 17½ day eggs, they are placed below. The air would then strike these hot eggs which are so hot that they don't take in heat. They are giving heat out, and they would continue to give it out, and that heat from the eggs in the hatch-

ing stage, 64 per cent., would be immediately driven out on the top of Smith, and it would never get back to his egg column, so in order to practice his teaching, there is no arrangement possible outside of the arrangement of the patent.

The Court: Then you mean that with the same amount of heat that is used now to hatch the eggs with the coldest eggs at the bottom that it won't operate to hatch the eggs if those same eggs are placed at the top of the incubator?

A. I don't mean that, your Honor. I am sorry——

Mr. Toulmin, Jr.: May I ask a question?

[fol. 345] The Court: Yes.

Mr. Tolumin, Jr.: We are drawing here a distinction between the teachings of what the patent is—

The Court: I was getting at the facts of that distinction.

Mr. Toulmin, Jr.: It may be confusing because we are not trying out the identity of what Smith does in his machine or may do, and our machine.

Mr. Toulmin, Jr.: Let me ask a question, your Honor, which may crystallize the whole thing.

By Mr. Toulmin, Jr.:

Q. Dr. Greene, based upon what you have just been saying, what do you understand to be the teaching of the Smith patent in suit as to the arrangement of the eggs?

A. The Smith patent in suit teaches that the oldest eggs—the hottest eggs,—must be placed at the bottom of an egg column, so that any heat given off from those eggs will be transmitted to the eggs in an earlier stage of incubation in that same column. The eggs are arranged with the earliest eggs at the top, and as you drop downward you get to eggs which are in later stages of incubation or hatching, and are hotter and give off more heat.

Q. Let me ask you, could you follow that teaching in the Smith patent if you placed the hottest eggs at the top and gradually came down with getting colder and colder eggs?

A. Not as Smith calls for it.

Q. Would you get the advantages taught by Smith in his patent if you arranged the eggs other than it specifies?

[fol. 346] The Court: Does the claim say anything about the use of heat from the eggs—the lower eggs—to heat the eggs above?

A. Yes.

Mr. Toulmin, Jr.: Just refer to the claims and answer his Honor's question on that.

A. I am reading from the latter phrase in Claim 1, "and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in a less advanced stage for the purpose specified."

In Claim 2 the same phrase is used.

In Claim 3 the same phrase is used.

The Court: What purposes are specified? It says "for the purposes specified"

A. The purpose specified is to conserve, your Honor, and to get along with less external heat supplied to this incubator.

The Court: What does it say in the patent application there about the purpose? It says for the purposes specified?

A. The purpose specified is to keep the hot eggs down, keep the temperature properly, also to give heat to these upper ones, which he does by circulating air around——

The Court: That is getting at the question of what he said, not what your construction is.

[fol. 347] A. Oh, I beg your pardon. I will read from the patent on page 2, line 79: It reads:

"It, therefore, appears that the improved apparatus and method contemplates the application of hot air circulating in a column with such speed as to keep the temperature substantially uniform and so arranging the eggs that the fresh eggs are placed at one point in the column of air and held in a horizontal plane until they reach a predetermined stage of incubation and then put at a different point in the same column of air and kept in plane inclined to the horizontal and thereafter placed at such a point in the column of air that the forced draft of air acts to hold the eggs at a uniform temperature and to prevent them from becoming overheated"

We are down now to about the eighteenth day, "and thereafter placing the eggs into final position for the hatching operation."

The Court: All right.

By Mr. Toulmin, Jr.:

Q. Now, Dr. Greene, have you made a careful comparison between the Smith patent in suit and the defendant James' machine as to the features of importance in the patent and in the defendants' machine?

A. I have.

Q. Will you proceed with such a comparison on each one of these features before the Court, and if you have a tabula-
[fol. 348] tion, will you follow that tabulation, so that his Honor can follow it with you.

Mr. Toulmin: I would like to offer this tabulation in evidence so that you will have a concrete piece of evidence, as our Exhibit No. 52.

(Tabulation of comparison between Smith patent in suit and James' machine marked Defendants' Exhibit No. 52.)

Q. Dr. Greene, before you take up the comparison, may I ask you one question along the line of his Honor's questions to you on the subject of carrying the heat, which may clarify it a little further? In the Smith structure, as I understand it, your position is that the only way in which the units of heat will be carried as required by the claims is to have the most advanced eggs in point of age and at the bottom of the egg column; is that correct?

A. That is correct, and I think that the drawings will bear it out if we show the amount of heat which is removed from this machine before any of the air column returns to this egg chamber.

Q. Now, will you proceed with this detailed comparison so that we can crystallize this matter?

A. The first difference, your Honor, is the size of the machine. In the Smith patent,—in the Smith commercial embodiment we have, as taught by Smith in his patent, a chamber of large dimensions, containing thousands of eggs, about the size of an ordinary room. An ordinary room is what we use in the patent. The capacity of the machine is

[fol. 349] from 30,000 to 65,000 eggs per machine. My notes taken at the Baby Chick Convention in Grand Rapids give me that figure of sixty-five. Comparing that with James, we find that James has a small box approximately three feet by six feet in dimensions, with a capacity of 5,000 eggs per machine. The 5,000 in this case include 4200 in the incubator and the remaining number would be in a separate machine, but it is called a 5,000 unit.

Second, the eggs are arranged in columns, in Smith, about six feet three inches high, closely spaced with eggs. In the James machine we have the eggs arranged in stacks about three feet high with the widely spaced eggs. In the James machine the eggs are placed side by side in a trough, and then another trough takes the other side, as you probably remember. Using this little egg, for instance (exhibiting egg), we had them placed side by side, whereas in the Smith machine the third one comes in to get a much closer arrangement. In the third place, we have spaced partitions, in Smith, extending the height of the egg columns to a point near the bottom or top of the room, forming a corridor between them large enough for a man to walk into in order to remove the eggs when the partitions are moved aside. In the James machine there is no corridor, and no space for a man to stand inside of the machine. There are no partitions to form a corridor.

Q. Right there, Dr. Greene, what is the importance or significance of the corridor and the machine being built large enough for a man to walk into a corridor in the Smith patent?

A. He has to have that unless he allows the air to leak out through the door. He must have a door for the entrance [fol. 350] of the man to bring the trays in. Then after the trays are in and the doors are shut, the shifting is done without the waste of moisture. He is trying to conserve moisture. Therefore, he has this large corridor in which the man must work.

Q. In view of the fact that the Smith machine, as you have testified, has air under pressure, due to these fans, what would happen to the hot air and the moisture in the Smith machine if you opened the doors and did your work in shifting the large number of egg trays to those eggs that were in the incubator and the contents of the incubator?

A. The corridor being under the highest pressure from the fan and the door being large in size, all of the outlet air would then go through this large door and all the fresh air that came in would chill down the room and be blown out even if it were hot. With it, of course, would go all the moisture in that atmosphere,

Q. Supposing instead of having a corridor in the Smith machine you opened up doors on the side and shifted the eggs or handled the eggs with the doors open, what would happen to the hot air inside?

A. The same thing would happen.

Q. In the James machine they have no corridor, as I understand you?

A. They have no corridor.

Q. They don't go inside the James machine?

A. They don't go inside the James machine.

Q. They do open the doors to shift the eggs from the incubator over to the hatcher?

A. They do that.

Q. And to load the machine?

A. Yes, sir.

[fol. 351] Q. And they do not disturb those eggs at any time so far as moving them is concerned during the period they are in the incubator? Is that correct?

A. If by moving you refer to moving the trays, you are correct.

Q. There is no shifting of the level of the tray in the James incubator?

A. No shifting of the tray.

Q. Why is it in the James machine if you open the doors there is no difference, whereas you say it would make a difference if you open the doors in the Smith patent type of machine?

A. In one case we are trying to conserve moisture, and you have a large space in the corridor, whereas, in the other one you have a smaller space; and also you have only to move two trays. Supposing the machine is running—supposing the fan is running, it takes you but a short time to move two trays out and put two trays in and close the door.

Q. In James?

A. In James. Whereas, in Smith, there are 72 trays to set if you are putting in fresh eggs, and that would take considerable time.

Q. In view of the fact in the James machine that the air column is not under pressure, what have you to say about the air being blown out even though the stirrer and impeller are being operated when the doors are open in James?

A. The egg chamber itself would have air sucked into it, but since the fan is running there is a discharge down through the channel. The device there would deliver air, and so you would have air removed, even in the James machine, if that door is opened.

[fol. 352] Q. But the amount would be small——

A. It would be very small.

Q. (Continuing.) —because you only have it open at intervals and then for a short period?

A. Yes, sir.

Q. Now, would you proceed with paragraph 4 of the comparison?

A. I would like to point out also, your Honor, under 3, that in the Smith machine time is taken to not only put the fresh eggs up in the upper rack, but you have to take the lower eggs from the hatching racks out, with the chicks, of course, now, and put in new ones and then move the chain or move the rack. That is as Smith details in his patent, not as he practices. In the commercial embodiment he has to move all of those eggs. He has to move first of all the three hatching trays. That takes time. If your Honor will allow me to point out on the Smith patent, the first thing to be done would be to move the three trays, 13, which would have eggs in them, which would have chicks in them. After moving trays, then you would have to take the three lowest trays out of the tilting rack 10. After having moved those, you would have to take the next three trays out and move them down. Then you would have to take the three trays above and move them down. You would then have to move the three trays from the top stationary rack and move them down, and then put in three new trays. The commercial embodiment is a great improvement in time over the Smith patent, and this is the method which is before the Court, as I understand it, and in this there is so much time taken that Smith could not afford to have anything else but a corridor in which the men could actually [fol. 353] work, and so, as I said earlier, in my testimony,

the word "corridor" to Smith does not mean a mere passage, but it is more in keeping with the dictionary definition of corridor, namely, a place for people to walk. I realize perfectly that the word "corridor" may mean anything that Mr. Smith wants it to mean, but in this patent it can only mean what he wants it to mean, namely, a place in which men will work.

No. 4. At the top of the partition are forced draft fans adapted to drive columns of air downwardly. These fans deliver from 6,000 to over 11,000 cubic feet of air per minute.

There are four fans in this case. In the James machine there are no fans, there is no forced draft. The volume of air in the front and back passageways is about 500 cubic feet per minute. We have taken that, your Honor, from Mr. Taggart. The average linear progress of the air suction is 47.5 feet per minute through the egg chamber. The suction of air per thousand eggs is 119 cubic feet per minute.

Q. Before you go to the fifth point, let us pause on number 4. In the first place, you say there are no fans. Recognizing that it would make no difference what you call a structure, but what it is, is important. Will you please state to the Court what is the difference between this top impeller marked Exhibit 50 here in the defendants' machine, and the fan which is marked 18 in the plantiff's patent?

The Court: Has he not already explained that? Has he not gone over that?

A. I don't think I have, your Honor, quite.

[fol. 354] Q. Make it brief for this contrast.

A. I will make it brief. The impeller which is only part —or which may only be part of a fan in order to make the fan, must be put within a casing. Mr. Taggart in his testimony spoke of the housing above and below the fan. That is true. There is such a housing there. But in order to make that a fan, in my opinion, we should restrain around the edge in the proper way the other part of the casing in order to take the air at one particular part with as little disturbance as possible. Then, as more and more air is added to the stream, bring it out here to the end with sufficient area to maintain that velocity. This is called the casing, and sometimes called the volute casing. In the

James device there is a periphery, and then top and bottom housing, using Mr. Taggart's expression, in which this air delivered is churned. Its velocity is not as it should be for a true fan. It does produce discharge, your Honor, because otherwise it could not circulate air. It does produce suction around a housing, but it turbulates and discharges this air in a very inefficient way, producing a pressure above the atmosphere in the chamber in which this impeller rests, and then it passes down front and back in the channels to the bottom of the James incubator, where the discharge through those channels front and back, is met by the opposing action of the stirrer, completely stirred and mixed with fresh air which is brought in at the bottom, and I have, as I told you yesterday, a booklet of the Buffalo Forge Company of 1914, which has been in my library and used, in which such a device is spoken of as the fan wheel, or in a later edition it is called the fan member. [fol. 355] And then in addition to that there is a picture right near by showing the whole thing with a casing, which is called a fan, and I wanted you to get my reason for saying this is not a fan in the accepted sense of the word. It does produce motion, but inefficiently.

The Court: If you have a fan confined as this is in the casing, you would have the same result, wouldn't you?

A. Not the same result. You would have a much higher result. You would get more air through and get a higher pressure.

The Court: If it was confined in a casing as this is?

A. You wouldn't have the resistance——

The Court: The shape of the fan is such as to throw the air out more, but if this were confined like this, above and below and at the side, wouldn't you get the same result?

A. Yes, sir.

Q. Wouldn't you get the same result as you do with this?

A. What were you comparing?

Q. What we call the fan——

A. No, sir, you get a much better result with the casing properly designed for it.

By Mr. Toulmin, Jr.:

Q. Dr. Greene, let me ask you a question. With that turbulator that is before you, Exhibit 50, as installed in the

[fol. 356] James machine, do you get the movement of the air in one direction only, or in a number of directions? What is it?

A. In this, the air is delivered outwardly and circumferentially, and we get the resultant motion, so that in this particular case it is moving in a different direction from every position. When you put the casing around here, you attempt to straighten those directions out so that the general column receives the air discharged in a proper way. We usually put that in there to direct that and get rid of the eddy currents which are produced when you do not have the proper confining passage.

Q. Why is it that James desires such a turbulent action from this type of impeller rather than a fan action with the true casing around it? What is the mechanical reason?

A. The reason is to get a stirring action up here, as well as in the bottom (indicating).

Q. What is the cause for the stirring action?

A. The stirring action is produced by the discharge from the individual plates not being directed into a properly shaped casing outside of it.

Q. I was referring to what is the reason in an incubator such as James, that James desires the turbulent action rather than the single direction stream action that we have been talking about in the Smith patent?

A. In the top of this casing within which the impeller is moved, there is a humidifying apparatus, namely, the waterpans. You have air coming up from below which has to meet the waterpans, absorb more moisture, and in order to make the discharge in the front and back channels more nearly uniform as to temperature, he uses that device.

[fol. 357] Q. And that stirs air over this heating device; is that right?

A. Yes, sir.

Q. Turn to the Smith patent in your hand. Does the Smith patent fan send the air in all directions or in a single direction?

A. The Smith fan is what is known as a propeller fan, and in general form it is the desk fan which has the propeller blade so formed that at the first discharge of the fan there is in general a high velocity downward current. This type of fan, according to Mr. Smith's specifications on page 2, line 11, states that the fan or series of fans 18,

mounted upon the hinged trap doors 19, forming the ceiling of the central corridor 5, constitutes the means for forcing the hot air through the chamber, and there are circular openings 20 provided in said doors, within which the fans are arranged properly.

I take that, your Honor, to mean that the fans should be so placed within the openings in the doors that any side action or centrifugal delivery would not take place for any distance because of the proximity of that rim, and therefore the air would discharge mainly downward, and this is a type of fan which does give a direct discharge and of high velocity.

Q. Now, will you proceed with the next part of the comparison?

A. No. 5. In the Smith machine over the fans are inlet openings in a typical machine having 78.5 square inches of space and over the outlet opening 162 square inches of space. In other words, in a machine which we will show the Court, there is a ten-inch circular opening for inlet, which is throttled down or could be throttled down according to the Smith patent, rather. And then there are four [fol. 358] rectangular openings approximately six and a half by six and a half, which when measured more carefully total up to 162 square inches, practically twice as much outlet as inlet.

In the James machine the opposite is noted. There are eight inlet openings an inch in diameter at the bottom of the machine, and four outlet openings an inch in diameter at the top of the machine; in other words, the outlets are one-half as large as the inlets, which is the reverse of Smith.

The sixth point which I would like to make is that Smith conserves moisture and James does not conserve moisture, because it has no draft to dry the eggs. As we will see later, the velocity in the Smith patent is so much higher than in the James machine that unless the content of the air is high, there would be excessive evaporation.

Q. While we are right at that point, let us settle that point. Have you examined the statement of velocity and the illustration as contained in Plaintiff's Exhibit 11-A, B and C, produced here by Mr. Taggart, a copy of which I hand you?

A. I have.

Q. Now, will you tell us whether in your judgment as an engineer, those figures are correct as indicated on that exhibit as to the air speed in the Smith machine, and if not, why not, so that the Court can have your reasons for the matter?

A. Taking the figures given by Mr. Taggart that the area of cross-section or floor area of the egg chambers in the Smith machine of the size tested by him is 75 square feet, and assuming as given by him that the four fans deliver six thousand cubic feet of air per minute, it is seen that the average speed of ascent through the egg chambers [fol. 359] with absolutely no structure within those chambers would be 80 feet per minute. I arrive at this conclusion, your Honor, in this way: If you have the quantity of air delivered per minute and divide it by the area of cross-section through which that air is flowing, the result is the average speed of the air.

If you don't mind an every-day expression, if we had a parade passing us, and we were told that a thousand men were passing per minute, and somebody told us that there were a hundred men in a row, we could easily divide that thousand by the hundred and tell us that there was ten lines passing us per minute. So in the air problem, if you have 6,000 cubic feet of air flowing through 75,000 square feet of duct perpendicular to the flow of air, we divide the 6,000 by the 75 and get 80. So that without any obstruction in these air chambers, the average speed of that air is 80 feet per minute.

Now, I have averaged up the readings given on Plaintiff's Exhibit 11-A, and I find the average of the readings in the egg trays at the top 74 feet a minute. Then, taking the vertical section which is shown on 11-C, I find that there are 67 feet per minute average.

Now, your Honor, these readings may have been taken and the readings actually observed. But they were taken—I am not questioning the statement that they were taken and that they were taken with eggs in the incubator, but there must have been some obstruction on the anemometer if these readings are correct because the average should have been at least 80 with nothing in there.

[fol. 360] The Court visited the machine of Smith and we placed an anemometer in one of the passageways between trays and we got a velocity of 60 feet a minute. That is

perfectly possible in one place, because the distribution is not uniform, but should you have gotten that for readings all over the egg chamber, the average would of necessity have come out 80. In fact, it might have been more than 80, because temperature and pressure does come into a very slight extent, and I am assuming now that the quantity of air in cubic feet does not change as it passes through the machine. That is an assumption and not the truth, because it does slightly change, as you put more pressure on it it will get smaller, and if you heat it up it will try to get larger, and if you don't increase the pressure it will get larger. But assuming that the quantity in volume per minute remains constant, the velocity through the egg chambers with nothing in them will be 80 feet per minute from the numbers taken from Mr. Taggart's testimony.

Q. Now, Dr. Greene, let me interrupt you there and ask you if the incubator as shown on Exhibits 11-A, B and C were filled with the eggs that that incubator is supposed to take in operation, what would be the true air speed through the columns of eggs?

A. The truer speed would be 280 feet per minute, the true average air speed. I had assumed the same air speed through the openings between the eggs as in these clear spaces going up. There would not be as much motion through the little egg spaces because of the extra resistance, and consequently I would say that the velocity in the passageway between the columns of trays would be more [fol. 361] than 280 feet a minute. The interesting thing, your Honor, is that if you now apply this lowest section of the Smith patent where the air cannot come up through the spaces between the trays, and has to pass through the egg trays themselves, the velocity would be 500 feet per minute, and it is that high velocity which Mr. Smith is teaching and which you will get if eggs are placed in this machine.

Q. Where do they get the 500 at the top?

A. Because you have more area there. The air can spread out. You see the reason the speed is so high is that the fabric which hangs down between the egg trays prevents the air from going through there. The only place for the air to pass is through the interstices between the eggs, and as a result, since that area is so small, the air has to speed up. As soon as it gets out in a place where there is more area of passage, it slows down. That is always so

element of inefficiency. Of course, you can't help it in a machine like this.

When you get to the very top as I spoke to you yesterday, the part in Fig. 1 beside the No. 22, there you have no obstruction (indicating), and you would then get your velocity of 80 feet per minute before it is sucked over here (indicating).

In this drawing of Mr. Taggart on 11-A he shows a velocity of 160 feet a minute, leaving the outlet which should have been numbered 28. It is seen that that velocity is much higher than the average velocity in the space below figured on quantity and area. The only way in which that higher velocity could be obtained by a drop of pressure or by a persistence of some small stream through that direc- [fol. 362] tion, and because that is marked 160 at that point and the average velocity is 80, it means that there must be a drop in pressure between the atmosphere and the top of the column, so that this machine filled with eggs must be a pressure stream.

Q. Now, proceed, Doctor.

A. Now, in No. 7 each egg in the Smith machine has 2.3 times as much air volume or incubator volume as the James egg. It figures out 16½ cubic feet per thousand eggs. Each egg in the James machine has 3.2 times less the air volume as a Smith egg, 7.1 cubic feet per thousand eggs.

Q. Dr. Greene, what is the significance of that difference between the two machines? Is that a mere matter of proportion or does it have something to do with the inherent operation of these two machines, the one in the Smith patent and the other the James machine?

A. I think it would mean that the machine itself would contain much more moisture, and, therefore, any leakage through walls would have to be protected in the Smith rather than in the James.

Q. As I understand this comparison, in the Smith machine each egg has a considerably larger space?

A. And has more air in contact with it also, which means—and you must not forget this—in Smith it means this large area prevents the variation of temperature and also humidity given out by the eggs more so than in James.

Q. Then, the internal volume of air within the Smith cabinet is several times greater—2.3 times greater per egg

than the volume of air in the James machine? Is that correct?

A. That is correct.

[fol. 363] Q. Now, proceed next test.

A. The Smith machine uses less fresh air than the James machine by 2.2 times less per egg. In the James machine there are 2.2 times more fresh air per egg than in the Smith machine. The rate of exit from the James machine averages 7.46 cubic feet per hour or 177 cubic feet per hour per thousand eggs. That is Part 8.

Q. Now, Dr. Greene, what significance has that comparison in connection with the statement that has been made that the James machine is not a so-called fresh air machine whereas the Smith machine is one that circulates the contained air within the cabinet primarily over and over again? Will you point out to the Court this distinction?

A. This point shows that the James machine handles 220 per cent. of the amount of fresh air per egg as in the Smith machine, and it means that that amount of air is delivered through the outlets, so that there is not as much moisture conservation in the James machine as in the Smith machine.

Q. Proceed with the next.

A. No. 9.

Q. Before you do that, will you tell the Court why it is that there would not be as much moisture conservation in the fresh air type machine of James as in the Smith?

A. Because you are using the same kind of fresh air but handling more of it and delivering it in a more humid condition. The machine which uses more fresh air, therefore, wastes—or not wastes but delivers more moisture.

Q. Let me ask you a question at that point, Dr. Greene. As you understand conservation of moisture it means in simple language the saving of moisture, is that right?

A. Yes.

[fol. 364] Q. And if you pass a large body of fresh air through an incubator you are not, therefore, saving the moisture? Is that correct?

A. Yes, sir, that is correct.

Q. And the amount of fresh air per egg that you pass through the James machine as compared with Smith is 220 per cent. greater? Is that right?

A. That is right. I would like also to point out on the Exhibit 51 the discharge here in James per thousand eggs

per day delivers 5,880 heat units whereas in Smith there is only 3,440. That is the amount of heat delivered in the two machines—in one of them—in Smith 3,440 and in James 5,880. That indicates also very clearly that the James machine does not conserve moisture.

Q. Proceed with the next one.

A. Ninth. The Smith machine places all hatching and incubating eggs in one compartment, the hatching eggs constituting one-fifth to one-sixth of all eggs in the room. There are no hatching eggs in the James machine reducing the heat from eggs 180 per cent. over the Smith method; a part of the James incubation on the 17th day is carried out in the hatcher. I think we have gone over that very carefully.

By the Court:

Q. Proceed with the next one. We have covered that.

A. No. 10. The Smith machine both incubates and hatches in the same cabinet. No. 10, the James machine incubates but does not hatch; the hatching being done in a wholly separate structure placed at a convenient location and when hatching there is no mechanical agitation of air. [fol. 365] No. 11. Smith has defined current; must have currents with forced draft to get through the long egg column.

James has no current; churns the air before it goes into the eggs.

Mr. Toulmin, Jr.: At that point, let me offer this stirrer of the James machine which we have been referring to as our Exhibit No. 53.

(Stirrer of James machine marked Defendants' Exhibit No. 53.)

Q. What is the effect of the air mixer or stirrer in the James machine such as was just marked Exhibit 53 in connection with the air, both cold and warm, which is entering the bottom of the egg chamber in the James machine?

The Court: Haven't we gone over this?

Mr. Toulmin, Jr.: I just want him to make a brief statement here, and then I am going to demonstrate that to you.

The Court: I think he has already answered that question,—at least the substance of it before.

Mr. Toulmin, Jr.: Then, if your Honor understands, I will withdraw it.

A. The stirrer receives the air coming from the channels both front and back, and the air coming in through the openings from the outside beneath the stirrer and churns those, destroying any kinetic energy in the direction of the discharge from the side currents, so that the air after being [fol. 366] stirred by this device enters the lower part of the egg chamber in a turbulent condition.

Q. Now, proceed with the next?

A. The Smith machine arranges the eggs with the hottest eggs at the bottom of the column and every time fresh eggs are inserted, all of the eggs are moved downwardly to a new position so as to keep the hot eggs always on the bottom, of the column.

Q. Is that James or Smith?

A. I may have said James. It should have been Smith. Under the James, No. 12, James arranges eggs in sandwich form so that there is no predetermined order of the eggs. The eggs are never moved after they are once placed in the machine. The James eggs are preferably arranged so that the hottest will not be at the bottom in order to prevent the hottest air and the hottest eggs being at the same place.

Q. Now, pass to the next.

A. 13. Smith moves his egg trays by lowering to a different position at intervals. 13. James does not move his trays.

14. Smith tilts a part of his trays.

14. James never tilts his trays.

Q. At that point, James rotates those cradles; is that correct;

A. He rotates the cradles but not the trays.

15. According to the Taggart chart, the hatching eggs give off much more heat as all of the rest of the eggs in the first eighteen days—the hatching eggs produce half of the total heat.

Q. On the James side——

A. Under the James side, as James eliminates the hatching eggs he eliminated 64 per cent. of Smith's heat so that he does not have to meet the problem of conservation of [fol. 367] moisture for the eggs that are hottest and must have the most moisture conserved.

No. 16. The hatching eggs require a larger proportion of moisture than the incubating eggs in order to prevent the drying out of the hatching eggs due to their high heat and due to their need for excessive moisture to provide mechanical lubricant so that the chick can detach itself from the shell.

16. Under James, James eliminates the hatching eggs from his incubator and therefore does not have the problem of conservation of moisture.

17. The Smith temperature recommended in the Instruction Book is 99 degrees.

17. James carries the temperature in his incubator at 100-½ degrees and in his hatcher a temperature of 102-104 degrees.

18. The humidity in the Smith machine is maintained at 88-90 degrees per the Instruction Book (Page 5) when hatching, which is continuous.

No. 18, James. The humidity in the James machine is maintained at 82-85 degrees in the incubator and large water pans in the hatcher with no control of moisture.

I would like to say, your Honor, that the term "maintaining humidity at 88-90 degrees" means that when we put in a wet bulb thermometer it will reach this temperature, which is a term used in practice, and is mentioned in the Instruction Book of Smith and also of James.

19. The Smith machine is under pressure. The pressure equivalent of air movement of about 490 feet per minute, or eight feet per second, or about six miles per hour.

[fol. 368] 19. The James machine is under suction because the stirrer evacuates the air adjacent the outlet openings. This sub-atmospheric condition is about .019 below atmosphere measured in inches of water while Smith is 0.14 above atmosphere.

20. The air delivery in the 47,000 egg machine at Buffalo, which we are going to show the Court, is 1,600 cubic feet a minute and in the Grand Rapids Smith machine it was 2,790 cubic feet per minute per fan. In the four-fan Buffalo machine this is 6,400 cubic — per minute.

20. James air volume delivered is only about 878.8 cubic feet per minute.

21. The Smith machine hatches because the hatching chickens are kept at the bottom and there is no moving means to injure the chicks if they fall out of the trays at

the bottom. That is, Smith has his trays down at the bottom hatching.

21. James cannot hatch in the incubator because (a) chicks would fall into the turbulator and be killed; (b) there would be too much heat; (c) they would foul the other eggs as they hatched; (d) the egg turning mechanism cannot be rendered inoperative for those trays not used for hatching; (e) transmission of diseases; (f) you cannot control the moisture conditions to suit both the incubation and the hatching operation.

No. 22. Smith conserves moisture because he must prevent the hatching eggs from drying out. Smith must conserve moisture because he handles a relatively large volume of air per egg which tends to dry out the eggs. Smith must conserve moisture because, by keeping the hatching eggs [fol. 369] with the incubating eggs, he adds 180 per cent. additional heat. Smith must conserve moisture because he has a forced draft machine that handles a large volume of air at high velocity.

22. James does not set up the condition of 180 per cent. extra egg heat and does not require the extra moisture due to hatching in the cabinet and does not have a large volume of hot dry air but, to the contrary, James uses a large volume of outdoor air that is laden with moisture and provides an unlimited amount of moisture in the cabinet. James has neither the reasons for conservation of moisture nor the means of retaining the moisture as James uses 2.2 times the fresh air of Smith and therefore could not conserve moisture.

23. Smith must use the corridor when employing large numbers of eggs because it would take so much time to shift his eggs if he left the door open that the eggs would become chilled and, as the machine is a pressure machine, the pressure in the interior of the cabinet would blow the hot air out.

23. James machine needs no corridor because the small number of eggs requires a limited time to insert new eggs and take out the hatching eggs:

That means of course, the eggs to go to the hatcher.

There is no movement of the eggs from one place to the other in the incubator. James machine is a suction machine and therefore, even though it operated it would not be injurious to keep the doors open; the operator of the James

machine does not have to go into a wet, humid and hot atmosphere to work.

[fol. 370] 24. Smith provides 16.5 cubic feet per thousand eggs.

24. James provides 7-1/10 cubic feet per thousand eggs of net air volume.

25. Smith has eggs arranged in a closed chamber with restricted openings to the outside air because his egg chamber is always at a pressure above atmospheric pressure.

James has no restricted openings to the outside in his egg chamber; and no exhaust openings of any kind from the egg chamber to the outside as the egg chamber is under subatmospheric pressure.

No. 26. The pressure velocity through the egg spaces is 148.8 feet per minute with a 2790 cubic feet fan.

James 26, the suction through the egg spaces is 47.5 feet per minute.

No. 27. The Smith fan turns at 1750 r. p. m. with blades angled to drive the air in one direction only.

Q. Your Honor, at that point, as I understand it, Smith's fan,—we have one here,—turns over about 1600?

A. That is right.

Q. And they range on from 1600 to speeds up higher than 1750, depending upon the machine?

A. Yes. 27. James evacuator and stirrer at the top of the machine turns at 860 r. p. m.'s and has flat blades churning air in all directions.

Q. You are referring in that to the impeller, Exhibit No. 50, is that right?

A. That is right.

The Court: I think we better adjourn at this time until two o'clock.

Recess until 2 P. M.

[fol. 371] After Recess 2:00 P. M.

ARTHUR M. GREENE, JR., resumed:

Direct examination continued.

By Mr. Toulmin, Jr.:

Q. Will you continue with your statement, Dr. Greene, in connection with your comparison and complete that?

A. No. 28 is the reasons why Smith must conserve moisture. (A) His conditions demand conservation: 1st. He has a forced draft tending to dry out the eggs. 2nd. His hatching eggs give off as much heat as his incubation eggs in a mass. 3. The hatching eggs demand extra moisture. (See Smith Instruction Books saying increase of moisture is necessary.) 4. Smith operates at lower temperature than James and therefore requires more moisture. He has to operate at a lower temperature. He has the hatching eggs which necessitate a lower balanced temperature. (B) The steps to conserve moisture by Smith: 1. Restricted air outlet openings. 2. Runs a lower temperature than James. 3. Circulates his air; uses less fresh air. 4. Has a large body of air for each egg compared to James. Has a larger carrying medium per egg for moisture. 5. The use of a corridor in which the operator may work without opening up the machine so that moisture will not be lost—the corridor is a moisture conservation instrumentality.

28, under the James column gives the reasons why James need not conserve moisture. (A) His conditions do not demand it so there is no need of it. 1. There is no forced draft. 2. The hatching eggs are not in the incubating cabi- [fol. 372] net. The elimination of the higher temperature eggs reduces the necessity for moisture in the James machine by not hatching in the James incubator. 4. There is no necessity for large quantities of moisture because the hatching eggs that need the most conservation are not in the cabinet. (B) Steps by James not to conserve moisture: 1. The use of 2.2 times more fresh air than Smith. 2. The use of 2.3 less space per egg than Smith so that a large volume of hot air is not continuously circulated per egg. 3. There is no blast or air circulation as in Smith, but merely a gentle motion.

Q. You mean suction?

A. Suction. 4. When the doors are opened any moisture in the machine is not conserved but lost. 5. The machine of James is insulated by the hollow walls on the sides and ends so that there are no severe heat losses.

Q. Before you pass to the next numbered paragraph, will you go back to the Smith column at the bottom, under B-5 and tell the Court what you mean by the corridor being a moisture conservation instrumentality?

A. I mean by that, your Honor, that this large volume of moisture in the large volume of air is present to be used later as a circulator, and also the walls of this machine are made tight and the door tight to keep that air from leaking out.

Q. Now, if you will go to 29.

A. 29, under the Smith column: Smith delivers a single current of air driven as an unbroken body under pressure through the long egg columns. 29. Under James: James brings two pairs of opposing hot air streams to a point be- [fol. 373] low the single short egg chamber and introduces four streams of cold air into the hot air streams and then mechanically turns all of these streams to prevent any current of air being formed and lets the cooled air thus produced rise under suction. (30. Under Smith: Smith has hottest or oldest eggs in same chamber with all other eggs: And arranges eggs in order of heat, always keeping hottest eggs below colder eggs to transfer heat to the colder eggs as the forced draft proceeds from the oldest eggs to the cooler eggs. Smith's air changes at every circuit it makes because new fresh air is introduced at each circuit and a part of the old air is released together with the heat it contains at each circuit: Therefore, to get heat transfer each circuit of air being different from the preceding circuit he must arrange his eggs in a predetermined order to get a heat transfer from the hottest eggs to the cooler eggs. 30. Under James: Heat from the hottest eggs in James cannot be carried to the cooler eggs because James does not have the hottest eggs in his incubator, such eggs being only in the separate hatcher: And such eggs as are in the incubator are not arranged in their order of age, but are irregularly arranged. In James more heat is extracted from the air to vaporize water and warm the fresh air entering than is given off by the eggs. Hence egg heat is not returned to the chamber. The heat returned is that taken up from the heating coils.

Q. That is what you were referring to this morning when you started to testify?

A. Correct.

Q. Now, Dr. Greene, with reference to the James machine, do you find in the James incubator any method of [fol. 374] hatching practice?

A. I do not.

Q. Will you state why not?

A. The hatching is done as called for by Smith—he distinctly speaks of the hatching part—in a separate and independent structure which has no heat or moisture or air connection with the incubator proper. In fact, it may be built without physical contact as a separate piece of apparatus in another part of the room, but it is in a separate box absolutely independent from any of the air circulation within the egg chamber.

Q. Now, Dr. Greene, the James incubator, do you find in the sense of the Smith patent a plurality of eggs arranged at different levels in a closed chamber?

A. I do not so find.

Q. Will you state why not?

A. The different levels of Smith as I explained to the Court earlier in discussing the patent, does not mean or does not have the connotations of the ordinary different level, but it means the levels discussed by Smith, which I have called levels 1, 2, 3 and 4; the first one being the fresh and stationary level; the second, the used levels which cover ten days in the tilting racks; the third level where he forces the air through at a speed of 500 feet a minute, and, finally, the fourth level which is the hatching stage. Different levels in this patent distinctly mean, in order to carry out the teachings of Smith, levels arranged with the coldest eggs at the top and the hottest eggs at the bottom, provided the current of air travels upwards.

Q. Now, do you find in the James incubator an egg chamber comprising the closed chamber having restricted open- [fol. 375] ings of sufficient capacity for the escape of foul air without undue loss of moisture?

A. I do not so find. The outlet in the James machine is in a high pressure chamber, whereas the eggs are in a suction or low pressure chamber.

Q. And do you find any restricted openings on that low pressure chamber as an outlet for escape for foul air?

A. There is no outlet in that chamber for the escape of the foul air, of restricted form. There is a passage into the impeller through which all of the air passes.

Q. Do you find in the James incubator a current of heated air in the sense of this Smith patent?

A. I do not find a current of heated air in the sense of the Smith patent by any means.

Q. Will you explain why?

A. As will be shown later, your Honor, the speed of progress as required by Mr. Taggart in the high velocity part of the egg cabinet—that is, over the vertical lines made when you tilt the racks—is 139 or 140 feet per minute. This is not a high velocity, and years ago Carpenter said that such a velocity was hardly perceptible; but that does not come into this picture quite. If we now go to the Smith patent and the tests made with 6,000 feet of air going through per minute, we find that the velocity in the clear space is and must be on an average of 280 feet of air per minute. Now, if we compare 140 to 280, we find that this velocity of progress in James is half as great as that in Smith, but since it is velocity head in many cases which affects the friction and thickness of film and impact, we would have to square that one-half, and so we would find the effect of the speed of progress as defined by Mr. Taggart in the James incubator, when referred to what must [fol. 376] be taking place in the Smith machine as an average we find that the effect is one-fourth as great as when expressed as velocity head. Moreover, as I said this morning, when you get down to the bottom sketch in Taggart the tilting rack, you find that part which is sealed off the cabinet room, shows that that speed of progress is 500 per minute to have these currents as Smith calls for, but I should say there are no such currents in the James machine.

Q. Aside from speed in this same subject of current, it is quite customary in ordinary language, Dr. Greene, to refer to any air moving any way as a current—that is a colloquial term, is it not?

A. Yes.

Q. Now, should we determine the Smith patent in the sense of any piece of air moving in any direction as a current, or does it have some special meaning in the Smith patent?

A. I think in the Smith patent it means currents which are defined, and along these paths the air progresses with a more or less uniform motion in lanes, distributed, of course, through the chambers.

Q. Now, do you find such an arrangement or such an operation of a defined body of air moving as a current of air in the James incubator?

A. As shown by the results of Mr. Taggart's tests I do not find such current.

Q. You are referring to Mr. Taggart's Exhibit 24 with the red marks on it?

A. I do. If you take for instance the top sheet which is marked Tr. y 10 from the bottom and note the distribution of the movement as recorded by the anemometer, it is seen that the velocities of these air movements at different parts [fol. 377] of this level are quite different, meaning that there must be some cross currents because of the change in energy due to velocity at these points. Then, moreover, of you compare, let us say, the next sheet No. 9 with No. 10, we find that the velocities indicated are quite different in similar positions in the tray, which means that as it progressed through these vertical channels there is a change in velocity, which means that there is not a persistent stream; if there were, these velocities would be more nearly alike. It shows very clearly that at various speeds there is not the chance for persistence from one level to another as you would get in the currents that Smith describes.

Q. What kind of motion would you say there is going through inside of the James egg cabinet?

A. I should say it was a turbulent changing motion, possibly with pulsations in it, and, as was seen from the lower trays, there is a certain amount of curling around.

Q. And what instrumentality in the James machine causes this turbulent and pulsations?

A. I think both instruments, both the impeller at its low speed and its limited number of blades, and the stirrer at the bottom both contribute to this motion. I would like to call the Court's attention to one thing on these sheets. Your Honor, the average velocity for the ten trays as indicated on the top sheet of Plaintiff's Exhibit 24 is 135.75 —of course, this is feet per minute. Now, it happens in this machine, Mr. Taggart said, that there was 500 feet of air per minute passing through—that or more, he did not state how much more—but using that amount of 500 as I did this morning with the 6,000, and dividing that by the [fol. 378] cross-sectional area of these chambers, we know that the trays or eggs in them—that area I have figured at 1,055, but for quick calculation if we say 1,000 it is near enough to the truth—500 divided by 10 would mean 50 feet per minute. Now, the air is speeded up to 135 because the

full area is not open to the air passage. We are now assuming the air to be a fluid of fixed volume. Mr. Taggart very nicely explained how that would happen in a river, in a stream. Let us take the lake here. We hardly know that it is moving, and when that same water gets into the Niagara River, and especially into the gorge, it travels at an enormous speed because the same quantity has to pass through a much smaller area. So in this the result is one that you would expect; that is, the average velocity, if there were no restrictions, would be 50. Here it is 2.6 times that much because we have over 2.6 times the area to pass the air. Now, it is that some relation which I used this morning in order to get the 500 feet per minute in the eggs at the bottom of the tilting racks of Smith, or 280 in the upper level.

Q. In other words, you are applying the same principles to Exhibit 11-A, B and C to Taggart as you are applying to Exhibit 24?

A. Exactly.

Q. And when you apply the same principles and methods then Exhibits 11-A, B and C is in error as to its speed?

A. Yes, sir.

By the Court:

Q. How do you explain these readings then?

A. The average quantity, your Honor—the average on each sheet is about the same. Now, it indicates that the [fol. 379] method used throughout the test at each level was a similar method and led to one result, which mean result is one that might be expected. I did not compute the amount of clear area in James. I could do that.

By Mr. Toulmin, Jr.:

Q. Let me ask a question, Dr. Greene. I don't think you heard the first part of his Honor's question. The Court wants to know whether in Exhibit 24 you agree with Taggart's figures in Exhibit 24—that is what the Court wants to know.

A. I agree that we take them, your Honor, and they are readings which would be expected, and from them you can interpret them as I already have. I have not made the test, your Honor; I have not tested the anemometers, and I could only use the figures for what they are worth.

Q. Your average would be a little less on that basis—the speed average.

A. No.

Q. Your computations would be a great deal less?

A. No. The average, without any eggs in there comes a great deal less; but putting the eggs in, speeds the air up to the reading which Mr. Taggart gets; that is, without any eggs in there or any trays, 500 feet would have the velocity passage of 50.

By the Court:

Q. That shows a velocity of 135?

A. Because he has restricted the area by putting eggs in there, and therefore it is a correct answer in form.

[fol. 380] Q. I am not sure. Does this show whether eggs were in or not?

Mr. Ely: No. These were made with eggs in the tray.

A. The test was made with the eggs in. We saw the device which he tested.

Mr. Toulmin, Jr.: Your Honor, here is a tray with eggs. This is one without eggs, but said to be eggs, and the only explanation of this, to make this figure right, would be to consider it without eggs. That is what he was bringing out.

Q. Now, Dr. Greene, in James the defendants' machine, as you testified this morning, you found no means for conserving moisture for the reasons you have already stated?

A. That is correct.

Q. Do you find any means in the defendant machine, by using a current of air of sufficient velocity to circulate, diffuse and maintain the air throughout the egg chamber at substantially the same temperature—that Smith in his patent is using that idea?

A. No, because in the Smith Patent the process is from the hottest eggs to the coldest. In James there is a distribution at random of the eggs. So if Smith by his method can do what he claims to do, James cannot do so.

Q. And, as I understood your testimony this morning, the units of heat will not be carried from the eggs in the more advanced stage of incubation to those of less advanced incubation, by the James machine because he has no mechanism or arrangement for that.

[fol. 381] A. Not only that, but he does not keep his hottest eggs in the device; so those are missing entirely.

Mr. Toulmin, Jr.: Now, your Honor, I am at the conclusion of the first chapter. We are ready to show our machines and the prior art machines. Our whole group of machines is next door. If your Honor will indulge us for a few minutes, we can step over there and look at them, that will shorten up the testimony very materially.

(Recess from 2:35 to 3:40 P. M.)

Q. Dr. Greene, we have just returned from a demonstration of the Smith machine, the defendant James machine and certain prior art machines, that is correct?

A. That is correct, sir.

Q. I have here a set of photographs and I first hand you a photograph so that we can identify that, and I ask you to state what that is?

A. This photograph is a photograph of a Smith machine, the inside dimensions of which are approximately 12½ feet long, 9½ feet wide and 7 feet six inches high in which there were 24 columns of egg trays, each column containing 12 trays, the tilting form, and two trays for the hatching stage below the tilting trays.

Beside it is a James incubator holding 4,200 eggs.

Mr. Toulmin, Jr.: We offer this in evidence as our Exhibit 54.

(Photograph of Smith machine marked Defendants' Exhibit 54 in evidence.)

[fol. 382] Mr. Toulmin, Jr.: That is a photograph of the exterior of the Smith machine and the James incubator. Mr. Ely, I don't suppose there is a dispute between us that that is the Smith machine that we saw over there a while ago?

Mr. Ely: No.

Q. I hand you three photographs, Dr. Greene, and ask you what they show in connection with our recent demonstration?

A. These photographs, four in number, which I shall mark A, B, C and D, are photographs which show the internal arrangement of this machine. In Photograph A, the ceiling is shown with three of the fans in their normal posi-

tion, and the fourth fan swung down. At the end of the corridor which is shown in this figure and which is really this whole picture—at the end of the corridor, above the fan you see certain of the pipes used for warming and humidification at the side of the picture is shown the canvass walls which determine the corridor dimensions, and on the right-hand side of the picture is shown the chains which support the tilting racks or trays.

Q. You need not go into great detail with these photographs.

A. The second picture B shows the exterior, with the door open, leading into the corridor, showing the size of this door. The picture C shows the corridor again with the door open, and a man standing inside with his hand on the tilting trays. The picture very clearly indicates the stationary trays for hatching at the bottom. And the photograph D again shows the exterior with the door open and a man standing in the corridor.

[fol. 383] Mr. Toulmin, Jr.: We offer in evidence these photographs as a single exhibit, "A", "B", "C" and "D".

The Witness: The letters "A", "B", "C" and "D" are arranged in order of the pictures coming there.

(Photographs marked as one Exhibit, Defendants' Exhibit 55, "A", "B", "C" and "D" in evidence.)

Q. Now, Doctor, did you witness a test that was conducted before his Honor and the parties on both sides, in connection with the pressure that exists within a Smith machine? Will you kindly describe what was done to the Smith machine to make this test, and briefly what was the test and the result of that?

A. The machine was brought up substantially to temperature, 99 degrees, and an endeavor was made to get the humidity correct.

Q. Was it correct?

A. The humidity I think was a little low on that test. I think the wet bulb showed 80 degrees, and I think they usually run a little higher than that. The attempt I think was to get it at the proper humidity to show the Court what really was the condition within the incubator.

Q. The Smith humidity runs from 88 to 90 during the action?

A. Yes.

Q. 85 during ordinary times?

A. 88 to 90 is the condition which I remember for the wet bulb. The Smith machine test had an inlet opening ten inches in diameter around, and four outlet openings, substantially rectangular, a little over six by six inches. The area figures out 78½ inches for the inlet area, and 162 [fol. 384] inches for the outlet. Now, with this condition, and the machine running without eggs, we opened up holes in the side and put a candle in front of these holes to show whether the air would be blown out or sucked in. If it were blown out, as it should occur, it would indicate a pressure condition. If the candle flame had been sucked in, it would have indicated a sub-atmospheric pressure. In all cases the candle was blown out and the condition was not quite the operating condition, because no eggs were in the machine.

Q. Would that operate better having less blown out or more out?

A. I think the opening No. 3 would show considerably more blowing out, No. 2 a little bit more and possibly No. 1 a little bit more.

Q. I hand you a set of photographs and ask you if they represent in substance what we saw this afternoon in the ones you examined here through these test holes in the sides of the Smith incubator?

A. They sustantially represent what we saw.

Q. I notice that there are three numbers: Smith No. 1, Smith No. 2 and Smith No. 3. Do these photographs indicate the openings and the candle at each opening?

A. Yes, No. 1 top, No. 2 middle, No. 3 the lower one.

Mr. Toulmin, Jr.: We offer them in evidence as our Exhibits, No. 56-A, B and C.

(Photographs of Smith Incubator marked Defendants' Exhibits 56-A, B and C in evidence.)

Q. And these three photographs, Dr. Greene, are those three openings marked in the side of the machine with [fol. 385] tags Nos. 1, 2 and 3?

A. That is right, I understand so.

Q. Now, did you observe similar tests made on holes on the side of the James machine that we observed, and holes communicating with the incubation chamber—the egg chamber?

A. I did.

Q. Will you describe what was the result of those tests you made?

A. The incubator of 4,200 egg capacity was filled with eggs in all four of its 20 trays, the stirrer and the impeller were in operation, and then a series of holes placed through the side of the incubator and leading to the egg chamber were opened, one at a time, and a candle placed in front of those holes. In all cases the candle flame was drawn into the hole indicating a condition of sub-atmospheric pressure within the egg chamber.

Q. Was a similar test made of the James machine, with the trays in position and without eggs?

A. Yes, sir.

Q. Was there a material difference in result other than that the flame was sucked into the opening?

A. I think there was a slight difference of result indicating that the suction at the top and bottom were more nearly alike than they were when the eggs were in there. The suction was quite different at the top than at the bottom, because that was nearer the fan, and the resistance of the eggs had to be overcome.

Q. Have you any photographs here of the tests showing the results of the tests we just saw this afternoon on the shop floor?

A. I have three photographs showing the condition at the top opening, at one a little lower down, and finally the suction of the air at the bottom opening near the bottom of the egg chamber.

[fol. 386] Q. Do these photographs correctly represent in substance what we saw this afternoon?

A. They do in substance represent that.

Mr. Toulmin, Jr.: We offer this in evidence as our Exhibit No. 57.

(Three photographs marked Defendants' Exhibits 57-A, B and C in evidence.)

Q. Now, Dr. Greene, did you observe any other test in connection with this James machine, and will you describe what that test was, so that we have it on the record?

A. We removed two of the egg trays from the left-hand egg cabinet, and the two lowest trays, and then introduced smoke into the lower part of the egg chamber, while the

impeller and stirrer were at rest. The smoke from a cigar was blown in by means of a little fan blower and appeared to ascend in a column, striking the trays a little higher than the entrance point, it curled over and began to fill the lower chamber.

Q. At this point were the stirrer and impeller at rest?

A. They were at rest. The column of smoke was rather continuous. At the proper signal the stirrer was started, without the impeller being started, and in a very short time—I would not say instantaneously, but it was so rapid that it was almost instantaneous—the smoke in this lower part of the egg chamber was diffused and turbulated so that it appeared as a uniform color. The appearance was quite marked as the impeller started to strike this column.

Q. What would you say the effect of the stirrer is on the air in the bottom of the James egg cabinet in the light of this demonstration?

[fol. 387] A. Speaking of the air which enters through the openings below the impeller, I would say that the impeller mixes this quite thoroughly in the chamber below.

Q. Now, did you see a similar test conducted with both the stirrer and impeller at rest, the smoke being introduced in the normal air inlet openings, and then both of these air moving instrumentalities set in motion simultaneously?

A. Yes, I did, and again the same observation was made in the lower part of the egg cabinet: That it was thoroughly churned and mixed, and there was no appearance of the side currents of air, if they could be called currents, or deliveries of air, at the velocities which they have in that cabinet, being carried up in the egg chamber. The two discharges from the side appeared to meet the stirrer itself and the currents from the stirrer, and the total amount of air within this lower part was churned, and there were no direct lanes or currents of air seen in the egg chamber above.

Q. Were they streaks in this chamber or was the distribution of smoke homogeneous?

A. To me it appeared homogeneous.

Q. What would that lead you to believe on the question of this current defined in the Smith Patent?

A. There is no such current as defined in the Smith Patent.

Q. That is your judgment as an engineer?

A. That is my judgment as an engineer. We also noted a discharge of this smoky air from the four small holes used as outlets from the chamber in which the impeller turns. The chamber confined by the top and bottom blades, called housings by Mr. Taggart, and the square side of the [fol. 388] box, with the water passed within it, and the obstructing water pipes, the air here came out, it was quite evident, and there was a pulsation to that air, which seems to me to indicate that the churning action of this impeller is not that—I think this is a very good test to show it, by the way—that the discharge from that impeller is not a steady stream, as would appear on a true fan with its proper form of casing. This large box in which the impeller is placed allows the blade, as it goes across in front to discharge its air.

Q. In front of these exit openings?

A. The exit openings. And then when it passes beyond the back of the blade, which is a place of sub-pressure—not atmospheric that would possibly suck it back again. It may also be due to the fact that there is such a true churning action in there, that you have that outlet and inlet which caused the pulsations.

Q. Did you see the candle held in front of the right-hand openings and was that candle, as long as it was lit, a steady flame or a pulsating flame?

A. It was a pulsating flame, and it was sucked in at times; at other times it was pushed out, and I think such a condition would probably exist through the machine. I think this is an indication, in one way, of the pulsating action through the whole machine.

Q. That is caused by this type of impeller or stirrer, with the flat blades, that sweep out of these outlet openings, is that correct?

A. Yes.

Q. And that instrumentality is Exhibit 50?

A. That is right.

Q. Now, Dr. Greene, do you recall any other tests were [fol. 389] made besides these? We next examined the prior art machines?

A. I was going to say, before leaving these two machines we called the attention of the Court to the hatching section which can either be an independent structure standing on its own legs, or placed on top of the incubator. We exam-

ined several devices of the prior art which had been used as incubators. One of these was that to Proctor, No. 553,723. Another, following the teachings of the patent to Schwartz, No. 535,175. Another to Goldstein, No. 1,137,752, and, lastly one built in acordance with the teachings of the incubator of Stulik, No. 155,917, of 1901 German. We also looked at a fan of high velocity, of high speed, which was set up for demonstration.

Q. Did you examine these photographs that I hand you in connection with the prior art machines that were in the demonstration room?

A. I have examined all of these photographs and find them in accordance with the teachings of the patent. The only part of the photographs with which I am not familiar are those showing hatched eggs and incubating eggs.

Q. You can disregard those. We will identify those later.

A. But the other pictures are in accordance with the exhibits.

Mr. Toulmin, Jr.: I offer them now as a single exhibit, Exhibit No. 58.

(Photographs marked Defendants' Exhibit No. 58 in evidence.)

Q. Now, Dr. Greene, while we are fresh on these particular machines, I would like to have you discuss these patents, before doing so, to facilitate a discussion of them, I [fol. 390] have here a booklet, photostats of these prior patents, your Honor. Will you look at those, Dr. Greene, and tell me whether those are correct photostats of the prior art patents and publications you are going to refer to?

A. Those are the correct ones. I have checked the patents, and they correspond, and I have also checked the drawings of the old English Book over almost 200 years ago, explaining this incubation of eggs.

Mr. Toulmin, Jr.: We offer this illustrative book in evidence.

(Booklet of photostats of prior art machines marked Defendants' Exhibit 59 in evidence.)

Mr. Toulmin, Jr.: Your Honor, before we start on this, I think I better make an offer in connection with some of

these machines we saw this afternoon. The Smith machine I did not offer because it belongs to Mr. Cory for demonstrating purposes.

The Court: Do you claim there is any essential difference between that and the best machine?

Mr. Toulmin, Jr.: Except that is an older type of machine. I don't see any essential difference between them. For the purpose of demonstration, that is all we needed it for. We have photographs of it here already offered in evidence.

The experimental machine—by experimental I mean the one we made experiments on, the James with glass windows, I would like to have that identified so that the Court of Appeals can identify it. Identify it as Exhibit No. 60.

[fol. 391] Now, these prior art machines I would like to offer in evidence—and they may be stored for the Court of Appeals if your Honor so desires—as our exhibit: The Proctor machine which was the first one we looked at, to be known as our Exhibit No. 61; the Schwartz machine to be known as Exhibit No. 62; the Goldstein machine as Exhibit No. 63, and the Stulik machine as Exhibit 64. We will have photographs of those.

I would like to offer in evidence that series of fans, the last one, your Honor, where you stood on the platform, as Exhibit No. 65.

Q. Now, Dr. Greene, if you will turn to either of your patents, or this folder, and go through the pertinent prior art patents that you think have a bearing upon the Smith Patent and upon the method of Smith bringing out those elements that would be of value to the Court in determining the scope of Smith and its validity? Will you please proceed, first taking the German Patent to Stulik No. 155,917?

A. The Stulik Patent 155,917 of 1901, German issue, teaches, quoting from the translation on the first page, "That heretofore uniform temperature throughout the incubator space had not received sufficient attention." He then goes on to describe, on his first page of the translation, that the individual egg carriers are either shifted latterly, one after the other, at certain intervals, until they have passed through the entire hatching stage, or a series of egg carriers, in which the eggs are to be placed at different [fol. 392] times, arranged below a hot water boiler, and

during the hatching time each egg carrier separately is placed a suitable distance from the heating boiler.

If you will look, your Honor, at 62.

Q. You are now referring to O——

A. The first figure on the large chart; and Stulik shows in this the heated air which entered at C in Fig. 2, passes over the series of trays B, leaving at the top D of Fig. 2. He has in front of these trays a large door G which may be opened for the moving of the trays, and then each tray has its small door F. The part below, at the lower part of B is the so-called brooder, which does not enter into this problem.

Stulik here places his eggs of earliest date, earliest age, youngest eggs, so that they will be bathed with the fresh air, which normally is hotter than those eggs.

Reading from page 2 of the translation, we find the following:

"On the other hand, and in accordance with the invention under consideration, the batches of eggs entered into the hatching space at different times are always directly exposed to one and the same hot air current in such a manner that the batches of eggs are removed progressively or in stages in the direction of the hot air currents from the source of heat, so that the individual groups finally have passed through the entire hatching space. In this way it is made possible that the fresh batches first entered in the hatching space are exposed to the full heat of the hot air [fol. 393] currents while the older batches of eggs which have already been shifted ahead in the hatching space are only exposed to the hot air current after the same has already given off a part of its heat. In this way it is made possible that, under due consideration of the natural heat developed by the eggs during the advanced stages of hatching, a uniform temperature prevails in all compartments of the hatching space, in as much as in the sections on top or along side the heat of which the warm air current is deprived is replaced by natural heat of the eggs. In this manner it is prevented that the older batches are exposed to an excessively high degree of heat."

That is, he teaches here, your Honor, that by bringing fresh air in this chamber, which has been brought from the

outside, you bathe the early eggs, which are cool, with this new air entering——

Q. Is that warm air?

A. How is that?

Q. Is that warm air?

A. That is warmed air. It must be warmed because of the source of heat below. Then, as it gives up its heat, it becomes more proper for the hotter eggs.

Now, Stulik here recognizes what Dr. Smith has recognized, that there is a difference in heat production between early eggs and late eggs, but his philosophy is just the opposite. He is not trying to conserve heat, but he is trying to hatch eggs in stages with the proper kind of air baths. The air, after it leaves the top of this is discharged, in the picture, into the room, and in the picture shown there is [fol. 394] no reason why that heat, or some of it, couldn't be returned to the device.

I have spoken of fresh air entering, which means that the air which is warmed by passing up through pipe C of Fig. 2 is introduced into this chamber. The air which leaves at the top D has received the heat of these eggs in the last stages of incubation; but Stulik was aiming to care for this difference in heat in such a way as to get, by stage incubation, a uniform temperature, or more nearly uniform temperature throughout his egg treating space.

The Court: Does C extend up into the incubating part?

The Witness: Yes, sir, C extends above the bottom of this chamber, and the whole thing is surrounded by water, your Honor, which is heated to maintain the heat, and the air which passes through the pipe C is heated by the gases around it. That is, there is the heating device off to the right of Fig. 1, marked K, and the gases from that heating device enter and pass around the air pipe C and heat the water jacket; and then there is a thermostatic control which regulates temperature, as was ordinary at that time. I would like you to realize, however, that this patent was taken out in Germany in 1901, and recognized some of the factors and advantages of stage incubation.

Q. Let me ask you a question, Dr. Greene: In this Stulik egg cabinet, we have eggs of different ages, is that correct?

A. We have.

[fol. 395] Q. And the eggs of different ages are used for the purpose of having the heat from one stage communi-

cated to another stage, is that correct, as the air moves through?

A. Yes.

Q. And after the air passes out the top of the machine into the room, the only air that can return to the machine is room air, is that correct?

A. That is correct.

Q. And the air, therefore, that is passed out of the top of the machine, after having passed in one circuit over the eggs in different stages of incubation, will go around when it cools, and drop to the floor, and then return through the inlet pipe where the air is again heated and discharged in the egg compartment, is that correct?

A. Yes.

Q. And is there, in that sense, a continuous stream or cycle of air through this machine?

A. In this machine——

Q. Is that correct?

A. That is correct.

Q. And the difference between this and Smith is only in the fact that Smith provides a compartment associated with the box but separated by a partition, whereas in this machine, the machine uses the room as the return path or corridor through which the air returns for another cycle, is that correct?

A. That is correct.

Q. And a person, could, of course, walk in this room in the same manner that a person walks in the Smith corridor, is that correct?

A. Yes.

Q. And a person walking in the room would use the room for the purpose of loading and unloading the incubator, is that correct?

A. That is correct.

Q. Now, will you pass to the next patent that you think [fol. 396] is of interest?

A. Mr. Toulmin, might I ask if you would prefer me to follow the pictures on each chart?

Q. I think you had better; it is in the nature of a chronological picture, almost so.

A. Would you give me the next one that you would like me to discuss?

Q. Guerin 3019 of 1843, egg hatching apparatus.

A. This, your Honor, is a patent to Guerin No. 3019 of 1843, and it is for a large sized incubator. On page one of the patent in line 74, he states that it is used for the artificial hatching of 7,500 eggs, and to rearing the chickens from the first month of its existence. In the first figure of the two shown here, we had a longitudinal section of eight arrangements of trays and three trays high. In the second picture on this chart, a cross-section is given, and over at the right, it is very evident that the trays are placed one above the other. This is not intended for stage incubation, but it is arranged so that eggs in the lower trays by ascending natural draft currents, will contribute heat to the upper eggs, if there is a difference of temperature.

The egg trays are heated by pipe coils which are shown in the right hand picture by the three circles over each tray.

An arrangement by Guerin cares for the chicks when they are about to hatch out by withdrawing the drawer a short distance so that they can get through to the front for air, and learn to appreciate a particular color which he hangs in front of the little door, so that after when they are placed in the chicken yard during the first month of their existence as chicks, they can enter these small brood-[fol. 397] ing cabinets which have the same colors hanging in front and will not get mixed up too much.

The patent is primarily to show that, back in the forties, large size incubation was recognized as a need, and in the other drawings of this patent, he shows the arrangement of his chicken yard so that chicks may be cared for, for three months before they are sold.

Q. Now, Dr. Greene, do you find in this apparatus with its 7,500 eggs, an arrangement of these eggs in tiers and trays, one over the other?

A. I do, yes.

Q. And provision for the circulation of heat?

A. Yes.

Q. And ventilation?

A. Yes.

Q. Does he mention moisture, do you recall, in this connection?

A. I don't think this patent records any moisture. We have that in another one which is quite early, however.

Q. Now, will you proceed to the next one on the chart in front of you?

A. The Cyphers patent, your Honor, No.——

Q. Just give that very brief attention.

A. 530,163 of 1894, speaks very definitely about the influence of moisture, and heat, and circulation of air, and carbon dioxide, and most of the things which we recognize today. A peculiar feature of the patent is the use of porous walls so that the condition within the cabinet may, by gas action, suck in moisture or give out moisture, dependent on the conditions outside. The heat is suplied in this by a boiler heated by a lamp, passing through the coils on the tops of the incubator, and then the peculiar wall is made of a porous material for the infiltration of air, humidity, [fol. 398] moisture and carbon dioxide, as I recall it.

Q. And does that patent teach conservation of moisture by the control of the ventilation?

A. Through these wall-, yes.

Q. Through the walls?

A. It is primarily concerned with maintenance of the proper condition of moisture.

Q. And that was by the restriction of the movement of air through these walls, is that correct?

A. That is correct.

Q. Now, pass to the next one.

A. We next come to No. 5, which is one of our important patents in this consideration, to Meschter, No. 347,946. Meschter provides for three trays in his drawing. He states that fresh eggs are to be introduced into a lower cabinet or lower tray B at the start. Your Honor will notice that the lower compartment is not connected in any way with the two compartments above. There is a water floor between the compartment B^1. I said B a moment ago; it should be B^1. At the bottom of the two compartments B above the one below is separated from the two above by a wall containing the heating water.

Now, Meschter states that he first introduces his eggs through the door on the side into this section which is absolutely independent of the outer part, as far as communication is concerned. and in this he has a chance to ventilate through the pipes DD. The eggs are held here for a certain length of time, and then the tray is taken from this lowest position to one of the two upper positions, where it remains until the full period. However, before that happens, since there is only one original tray for the placing of the early

[fol. 399] eggs, the other tray must have developed its chicks so that the new tray introduced into B^1 is then taken up to the other one of the B^1s.

Meschter states on page 2, at line 44, "In practice, there are three sets of eggs in the incubator all the time," that is, the early one and two others of later but different dates, for periods of incubation.

He says, therefore, that in practice there are three, and it is evident that, by varying the capacity of the incubator, more than three sets of eggs could be simultaneously treated. Here he is teaching stage incubation of more than three separate stages.

Q. In the same compartment?

A. In the same structure.

Q. And do any of the trays with the eggs of different ages communicate with one another?

A. The latter two, or the last stages, do communicate. In the early stage, however, the heat should be applied, and, of course, in such a machine as this, if the water is hotter than any egg, it gives up heat. On the other hand, if the water is maintained at a temperature lower than that of the hatching eggs, which are giving off their greatest heat, and also at their highest temperature, that water may receive heat and, by circulation, enter into the lower eggs; but in the upper set of trays, the two sets, there is communication, not shown in this figure put on the chart, but if I could trouble the Court to look at Fig. 2—if you want to look at mine, because it is open right here, your Honor, Fig. 2 of Meschter, you will see that there is a space——

Q. Just a minute, Doctor, until the Court finds that. It [fol. 400] is near the front, sir.

A. Fig. 2, the one at the left. You will notice the part marked PZ, which is an air channel connecting the upper two tray chambers together, and there can be circulation, and the figure which is put on the——

Q. Well, now, Dr. Greene, you say "can be". Is it not a fact that there is circulation?

A. There is circulation, undoubtedly, for this reason, that I was just about to call the attention of the Court to: that is, in Fig. 2, it will be noted that the ventilation air which enters at DD near the top, only enters the upper chamber, apparently, and if it were not for this circulation,

which does occur—not only can, but it does—we would have a high content of heat, moisture, and everything else, in one of these trays. You will also note in the figure on the chart that the thermometer D which controls the temperature of the upper two trays, and gives an indication of its temperature, is in only one of these two trays, indicating very clearly that circulation between these two chambers does occur and will occur.

Q. Now, what about the openings; are those openings large openings or small restricted openings?

A. They are small openings compared with the volume of the machine.

Q. What about the moisture; is that applied?

A. What, sir?

Q. The moisture; how is moisture applied?

A. The moisture in this particular machine is applied by the trays marked O^2 which are metallic or other kind of trays, and on top of them is placed a piece of blotting paper or some other absorbent material which holds the moisture and exposes a large surface for evaporation.

[fol. 401] You will note that, in the first stages of incubation in the lower one, there is no water chamber, because the eggs in this early stage do not need moisture.

Meschter, at this early date, appreciates the things necessary for incubation. He controls his moisture. He controls his heat. He has staged incubation. He arranges for the turning of the eggs, and through the water jackets, heat from some of the eggs undoubtedly passes to some of the others, and also he calls for making these of larger sizes.

Mr. Toulmin, Jr.: I call your Honor's attention to page two, line 44, to 54, which your Honor might like to mark, where it teaches the use of more than three sets of eggs, and the transfer features. The preceding paragraph is also interesting, starting at line 33, running down to 44.

The Witness: I would like to read it, if you desire, Mr. Toulmin?

Mr. Toulmin, Jr.: No, I think his Honor has marked it; no need to read it, to save time.

Q. Have you anything more on this patent, Dr. Greene?

A. No, I have covered that one.

Q. Now, this patent, to summarize it, shows the use, does it not, of a series of egg trays, one over the other, a portion of which, at least, communicates with one another?

A. Right.

Q. And the eggs are in different stages of incubation?

A. That is correct, sir.

Q. And there is air circulation?

A. Correct, sir.

[fol. 402] Q. There is conservation of moisture?

A. Yes.

Q. There are restricted openings communicating to the outside?

A. Yes.

Q. This has everything except a mechin-cal fan, is that correct?

A. That is correct.

Q. And what have you to say to the circulation of air by means other than mechanical fan? Just make that brief.

A. The mechanical fan has the advantages of getting considerable capacity in a small space, and with the improvement in fans, which has occurred in the last 25 years, and also the cheapening of power and the supply of power, the fan is undoubtedly better fitted to do the circulation than either the steam jet, which is mentioned by the Buffalo Forge Company as a method of producing a draft, or the gravity system of natural circulation. At the time that most of these patents were issued, fans of small sizes and small motors, and even the supply of electrical energy to the farm, was something not dreamed of, and in principle, circulation is produced by causing a difference of pressure.

Q. By heat?

A. By heat, yes, or by fans, or by moving streams of other fluids.

Q. Well, now, as to the rapidity of a stream of air rising from a heating lamp, what, approximately, is the speed of the air so heated?

A. I have made tests with a piece of pipe, stove pipe, four and one half inches in diameter, and as I recall it, about three and one half feet long, and I placed two candles —one candle finally—below that pipe, which I covered with a non-conductor to conserve the heat, and I got a chimney effect, giving a velocity of about 120 feet a minute.

[fol. 403] Q. From a single candle?

A. Heat from one candle.

Q. And what would you say would be the velocity through pipe such as Stulik, where you had a lamp or other heating

means furnishing the heat? If you will look at Stulik for a moment.

A. The pipe alone might have a fairly good velocity, but I believe the resistance of the eggs would produce a velocity less than that which I have stated, but it must have produced sufficient velocity to enable him to maintain a uniform temperature within his staged incubator.

Q. Now, will you pass to the next one?

A. The next one, No. 7, is McAslan of 1895, No. 540,107. This is a patent teaching stage incubation and the regulation of the position of the egg trays in accordance with the age of the eggs. In this selected Fig. 1 of the McAslan patent, we have three egg chambers. These egg chambers are heated by water warmed by the lamp at the left, and circulated in the ceiling of the incubator. In the left-hand compartment is a thermostat to regulate the lamp and also regulate the flow of air. The eggs can be raised on the platform by the rods 16, which are moved by handles projecting out from the side of the incubator.

At this date McAslan recognized the various amounts of heat and temperatures of eggs in different stages of incubation, and placed eggs of different ages within one circuit, however, using eggs of the same age in each one of his compartments.

Q. Does he mention that fact in the specifications, as to having several compartments and adjusting the conditions [fol. 404] to the eggs of different stages of incubation?

A. He does. Reading from page 1, line 7:

"My invention relates to improvements in incubators and in the heating apparatus therefor; and the object of my invention is to produce a cheap and simple incubator which is arranged in a series of compartments adapted to contain eggs to be hatched, which has the egg trays in several compartments arranged in such a way that the eggs may be subjected to different degrees of heat, according to the length of time they have been in the incubator, which has a perfect means of ventilation, which has its heating apparatus constructed and arranged so that the temperature may be controlled to a nicety, which has a thermostatic device to regulate the heat, and which also can be easily regulated by hand if desired."

Q. Now, Dr. Greene, does this patent teach the use of separate compartments for the handling of eggs of different ages as in the case of separate hatching?

A. It does.

Q. And this was in 1895?

A. That is correct.

Q. Now, will you turn to the next patent, please?

A. The next patent, to Woods——

Q. What is the number?

A. 656,760.

Q. British patent?

A. Beg pardon.

Q. Is it a British patent?

A. No, it is an American patent; Woods, 656,760, U. S. of 1900, is brought in to show the control of air circulation through a box C on top for inlets, and F at the bottom for outlets, through membranes I and J, so that there [fol. 405] are no currents over the eggs, but the air travels smoothly in a diffused form. There are regulators W and X at the left-hand side of the picture which control the admission of air as the temperature changes, because at the right hand side of the picture R is a thermostat. The handle M extending out at the right of the machine is for the purpose of turning the eggs at different times.

Q. The compartments here are arranged parallel instead of one over the other, is that correct? But, they communicate by common communication passage ways as in Fig. 2? Have you got Fig. 2 before you?

A. In Fig. 2, which is a continuation of this patent, Woods states, on page two, line 85, "Furthermore, the entire number of eggs, say 1,000 or 2,000 contained in any one hatching chamber, should be spread out on the movable trays so that all would occupy as near one level as possible."

He then states that, for this large number, the arrangement shown in Fig. 2 would be employed, and in this case, he places them side by side, with a partition between.

Q. Now, the next, Doctor?

A. The next patent, to Bell, is a very important one, your Honor, and I think that the figures 9, 10, 11, illustrate the figures of the patent. The description, however, of this patent, is most important.

Q. You do not mean figures 9, 10, 11, for the views?

A. No, figures 1, 2, and 3 of the patent, but numbered 9, 10, and 11 on this chart.

Q. I see.

A. Bell, in his invention of 1902, states on page one, line 8:

"This invention relates to incubators, and has for its [fol. 406] object to provide an improved device of this character which is of great capacity so that an attendant may have access to the interior thereof, for the examining of the eggs, and for any other purpose, without exposing the eggs to the outside temperature. It is, furthermore, designed to provide for effectively ventilating the interior of the device so as to preserve a proper temperature for the unhatched eggs, and also, for the recently hatched chickens, and at the same time prevent the incubator from being chilled too rapidly."

If you will look at Fig. 1, your Honor, you will see that this is practically a house in which a large number of trays are arranged in tiers. The circulation is produced by the lamp 15, or more lamps, as he says. The humidity is cared for by the water pan 20. The opening 14, which you see in the picture, is the opening for the admission of fresh air. With the general scheme as shown in this picture, it is then well to turn to the previous page of the patent, containing Figs. 2 and 3, and we note that in Fig. 2 the fresh air inlets 14-14 are shown. The outlet in the roof 17 is controlled by the damper shown in Fig. 3 at 16, and then also there is a regulator 19 which closes off this outlet automatically. The air which escapes into the roof of the building can leak out to the atmosphere.

In this machine the limited amount of fresh air is controlled by 14-14, and the air which is warmed and started in a motion by this heating device 13 traveled up through the egg trays and then, of course, to supply the air which [fol. 407] has been raised through the instrumentality of the lamp. The air has to circulate down through the corridor shown in Fig. 3, so that we have here eggs arranged in tiers and the circulation of air going over the various eggs, the return of that air, the mixing of fresh air to control the proper humidity and oxygen content, and then, if we look at the picture, Fig. 1, we see that the number of

eggs is so great in this, that in accordance with what he says, and also from what we know from the evidence in this case, if this were not staged incubation, the heat from several lamps would not be sufficient for the heating of the eggs; and also, at the end of the period, not enough fresh air could be brought in to keep the temperature down.

He says distinctly on page one, line 14:

"It is, furthermore, designed to provide for effectively ventilating the interior of the device so as to preserve the proper temperature for the unhatched eggs and also for the recently hatched chickens, and at the same time prevent the incubator from being chilled too rapidly."

In this, if Mr. Smith claims that his disclosure covers anything but that which he says distinctly in his patent, namely, the hottest eggs at the bottom and colder eggs as you gradually go up, then, with the exception of a motor-driven mechanical fan, we have all of his teachings in this patent.

Q. And what would you say as a mechanic and engineer, as to the lamp 13 and its equivalency to a motor-driven fan blowing air over hot pipes?

[fol. 408] A. Well, your Honor, I have, as I say, made a test during rather warm weather, with a single candle, to keep the temperature of the circulated air from rising above 99 or 100 degress, and I have gotten this velocity in a four and one inch pipe.

Now, we know that in boiler work, previous to the time at which fans were manufactured at reasonable prices, and properly constructed, we used chimneys for draft I personally was connected with the Philadelphia Traction Company when we took out fans which were producing induced draft on our boilers, and substituted for those fans stacks 170 feet high. Now, the fan was probably 18 or 20 feet high; and in this particular instance, they were having so much trouble with the economizers to which the fans were attached that the engineers of the company thought it would be cheaper for them to substitute for mechanical drafts, induced draft, a natural circulation chimney. Each of these forms of devices can be used for moving the air, and any air movement through them are the equivalent, although they have certain inherent qualities, which would make me prefer one rather than the other.

Q. Now, Dr. Greene, do you find in this Bell patent, a teaching of staged incubation in a compartment that is big enough for a man to walk in the corridor adjacent to the eggs where thousands of eggs are put in tiers one over the other?

A. I do.

Q. Do you find a teaching of the application of moisture within such compartment, to the eggs?

A. I do.

Q. Do you find a teaching of continuous circuit of heated [fol. 409] air laden with moisture, passing up through the eggs and I find a circuit but it is not continuous because hot air is driven out at the top from the vent and cold air is brought in at the bottom.

Q. And with the exception of that it is continuous?

A. It is continuous.

Q. And in the same sense, Smith does have a continuous circuit because he takes in some cold air and releases some foul air; that is correct?

A. Who?

Q. Smith.

A. Yes, that is correct.

Q. So that Bell and Smith are alike in circulating the air, which is heated, around and around through tiers of eggs of different ages, releasing some of the air and taking in some of the fresh air; that is correct, is it not?

A. That is correct.

Q. And you have the restricted opening at the top of this Bell incubator, which is controlled to the amount of air that is released, is that correct?

A. That is right; it is straight automatic or hand control.

Q. And in Smith, he restricts his air inlet opening rather than his air outlet opening, is that correct?

A. That is correct.

Q. And in this Bell patent, we have a small passageway 14 of restricted size for the inlet of fresh air, is that correct?

A. That is correct.

Q. And does this patent teach the use and advantage of a man entering into the incubator and standing in the corridor for handling eggs which prevents hot air from making its exit while the handling is going on?

A. That is very clearly stated in the part which I read.

Q. Now, is there anything in this Bell patent that Smith [fol. 410] does not have with the possible exception of the question of whether the lamp 13 is the equivalent of the power-driven fan? That is the only issue between them, is it not?

A. That and the distinct statement that Smith makes that the eggs must be put in a particular order.

Q. Now, will you pass to the next one?

A. Now, the next patent, your Honor, is to Perkins, No. 798,697, of 1905. This patent teaches staged incubation and a continuous progress of the egg trays, tilting them as they pass through the separate compartments. The large chart in Fig. 12 reproduces Fig. 4 of the patent, and Fig. 6 of the patent is marked No. 13. Looking at Fig. 6, the eggs are introduced in trays at the right hand and of this arrangement of compartments and connected to an endless chain. The eggs remain in the compartment for a certain length of time, and then they are moved by moving the chain through the means of the handle into the next compartment, which is marked J in Fig. 6. You will notice the chain is inclined downward as the chain enters that compartment, and then inclined upward, so that the eggs within the trays get a slight tilting motion, as has been known for many years, is the proper way to treat eggs.

Then this progresses from day to day, until we reach the extreme left of the figure, at which time the egg tray is removed from the upper compartment and placed into the lower compartment on the belt passing through there, and then progresses across to the right, and finally the tray, at the hatching period, reappears over at section A^1.

[fol. 411] In this Fig. 6, the heating is controlled by means of electric lamps and the same thing is shown in Fig. 4, although in Fig. 4 we have hot water coils or steam coils H in the air channels. The air is introduced through openings C to E^2, which may be regulated by opening doors, more or less depending on the amount of air which a particular compartment needs.

The separate compartments have individual thermostats in them to regulate the heat proper for that age of egg. Perkins at this time recognizes that there should be a difference in the amount of heat for the different eggs, and in this machine he speaks of carrying out the number of compartments so that the eggs can advance through the com-

partments each day, or remain one day on one side of the compartment and the next day on the other. As you enlarge the machine, you can allow the eggs to stay a smaller time in one of these sections. This is a machine of large capacity for staged incubation, recognizing the need of heat and air for the different stages. The temperature and the air circulation are regulated.

Q. Does this patent recognize the necessity for putting eggs in the separate compartments according to age, as in the case of separate hatching?

A. It does.

Mr. Toulmin, Jr.: I call your Honor's attention to several parts of this patent that you might like to mark with a pencil, if you wish, pertinent parts. It is the patent to Perkins, 798,697. On page one, the left-hand column, line 7 to 26.

The Court: I see there are some markings here.

[fol. 412] Mr. Toulmin, Jr.: And then lines 46 to 52; and then in the right-hand column, running along from 85 to 95, about the air inlets and outlets.

Now, on page two, lines 31 to 41, and the bottom of page two on the right-hand starting at line 127 to the bottom of the page, and at the top of the succeeding page to line six; and then a paragraph in the same column starting with line 20 and running to the end of that paragraph. Then, over on page four, at lines 85 to 90 and then over on page six, lines 21 to 29, teaching the addition of sections as James used additional sections, lines 20 to 29.

The Court: Those are marked already.

Q. Now, Dr. Greene, will you proceed to the next patent, please?

A. The next patent shown on the chart is that to Osborn, No. 1,144,232 of 1915. This patent, your Honor, is shown in Fig. 6. The cross-section contains a series of trays arranged above each other, and these trays are mounted on an angle iron so that they can turn; the whole device is circular, and it is warmed by means of gases from the lamp which heats the water that circulates around to the periphery of the machine and the top and the bottom. You will note that there is a regulator DD at the bottom for admitting fresh air, and at the top openings DD controlled by dampers for the discharge of this air. There is a net work

in the bottom of each pan so that natural circulation due to gravity may occur within this chamber. The heated air from any hot eggs would be distributed upward, to be replaced by air coming from beneath it and starting up a circuit within the chamber.

[fol. 413] The patent states on page one, line 107:

"The division of the trays by means of partitions provides for the distribution of eggs, or in other words prevents the mixing of different kinds of eggs"; and on the next page, continuing, "It is apparent that the incubator may be continuously operated, fresh eggs being supplied as others are hatched."

This to me, teaches the fact that the inventor-patentee is endeavoring here to arrange his eggs in trays shown in Fig. 4 with each division so that he may put new or old eggs in the same tray, but separated, and he may work it continuously. Continuous operation indicates operation on each day, and the principle shown in this patent indicates the possibility and the wording indicates the probability that in this device Osborn is practicing staged incubation, heat control, fresh air control, circulation of air within the chamber, trays arranged vertically, a method of producing that circulation through heat from the eggs as well as from the water jacket, and then finally a control of the outlet. His circulation throughout the whole device is produced by natural circulation of heat transfer. There is no outside corridor, and there is no mechanical device for moving the air.

Q. Now, you will pass to the next one, please.

A. The next Patent, No. 15, is a Fullington 1,205,445. The purpose of the patent is well stated on page 1, line 9. The invention relates to incubators or brooders, and has particular reference to an attachment or a type of devices [fol. 414] which may be dependent upon an automatically regulated temperature at which the brooder or incubator is kept.

More specially, it is the object of this invention to provide means normally quiescent for removing the heated air from the interior of the incubator when actuated automatically by means governed by the increase of heat so that the overheating of the incubator is prevented.

The devices, your Honor, as shown on the chart consist of the fan nicely illustrated in Fig. 3, but applied to the top of the incubator as shown in Fig. 1. The small fan driven by an electric motor, 10, is driven in the patent drawing by a dry cell 13. Connected to this motor is the fan 1 to 12, which delivers there through the pipe 18 and down into the incubator space. The pipe 17 withdraws air from a perforated ceiling or cavity in the box and by means of the little diaphragm shown in Fig. 5 over at the lower left of the picture the partition or obstruction 17-B forces part of this air which is being sucked along out into the atmosphere thus removing some of the foul air from the device. At the same time if you look at Fig. 1 you will see that there is the opening marked 20—reading from page 1, line 103—a branch pipe 20 extends from the turn of the pipe 17 and passes through the wall of the fan chamber 9, opens into the air without, and thus provides means whereby fresh air enters the fan when the latter is running, said air being forced through the pipe 18 into the incubator.

This Patent, your Honor, of 1916, November 21st, discloses a fan attachment for maintaining temperature within an incubator, removing foul air, bringing in fresh air. The [fol. 415] picture 4 to which I have not referred is the thermostatic control of the motor. Should the incubator be set for a continuous operation this device would circulate a certain amount of fresh air and remove foul air continuously.

Q. Do you find in this patent the teachings of the continuous circuit of air with some relief for foul air and some introduction of fresh air as the circuit continues?

A. That is true. The diaphragm 7 does not remove all of the foul air but only a portion of it, and the remaining fresh air is brought in through the pipe 20.

Q. And this is in an incubator?

A. And is connected to an incubator, and it is entitled an incubator attachment.

Q. Prior to this time in various patents, Bell and others, they use all of those features with the exception of the fan as shown?

A. That is correct.

Q. And to that teaching the Fullington adds the power-driven fan for circulation purposes? Is that correct?

A. Yes, sir.

Q. Pass to the next one.

A. The next patent is the British Patent to Gardner, No. 10,288 of 1887. The chart, your Honor, quotes only the claim of this patent. The improvement is relating to incubators substantially as hereinbefore described, which consists in the arrangement and operation of a series of incubating chambers or chambers containing incubators heated by air set in motion by an artificial means (that means not natural air-circulation), each of the series after the first being kept at a slightly lower temperature than the preceding chamber, and the eggs being periodically transferred through the series from the chamber having the highest to that having the lowest temperature.

[fol. 416] I would like to, your Honor, to call attention to the fact that this patent from which only the claim has been produced on the chart states very nicely the knowledge at this time, which you must remember is 1887—that is practically 20 years before Smith—that at that time differences in conditions of eggs at different periods of incubation was clearly known. He states for instance on page 1, line 14: "The incubator constructed according to these improvements consists of a series of compartments or chambers within which are fitted drawers for containing eggs. Care is taken in the construction that all the drawers are interchangeable. I have found by experiment that the external or artificial heat required for hatching gradually diminishes from the first day, the total difference being about three degrees. I therefore arrange that each chamber or compartment shall be continuously maintained at the same temperature and that succeeding or different chambers shall have different constant temperatures, so that the drawers containing the eggs may be periodically transferred from the high temperature chamber to the lower, until they have passed through the whole series of chambers and are finally hatched in the chamber having the lowest temperature, thus without limiting myself to any particular mode of construction or number of chambers, the first chamber may have a constant temperature of 105 degrees, the second of 104.5, the third of 104, the fourth of 103.5 degrees, the fifth, 103, the sixth 102.5, and the seventh and last 102 degrees.

In such an arrangement the chickens would be hatched continuously. Fresh eggs may be placed in the first com-

partment of the apparatus daily for which purpose it will [fol. 417] be convenient to arrange three or a multiple of three drawers in each chamber, so that each day's eggs may be kept separate, and be separately transferred to the following chamber on the following day.

Each of the chambers or compartments communicate with a flue which is connected to an exhaust fan, an aspirator or other means for withdrawing the air."

Your Honor, he definitely points out that since the eggs in the late stages are giving up heat he requires cooler air to abstract that heat. The earliest eggs needing heat, he wants the hotter air in those compartments. Then he says that he can arrange these seven compartments to be used for shipping daily, meaning that in each one of the compartments he has stage incubation and circulation of course, because the atmosphere is maintained uniformly so that even here in this date of 1887 we have taught the demand and requirements of eggs at different ages, stage incubation in separate chambers, divided or sub-divided to stage incubation within the same chamber, because he distinctly says that he would put three eggs in one chamber and take a tray from the chamber daily and replace it by another tray.

Q. And it teaches the use of the exhaust fan for controlling the air circulation and atmosphere within an incubator? Is that correct?

A. He does.

Q. Now, will you pass to the next one?

A. Before passing to the next patent I think that the patent to Renwick is not given on the chart.

Q. All right, refer to it.

A. I would like to refer to it, because at this early date it is only a minor matter, your Honor I mean it is a minor in the patent but it is important as to date. In this Ren- [fol. 418] wick Patent No. 193,616 of 1877 we have this statement which to me is very important. He states in the second paragraph on the first page: "The requisites of an incubator are a regular heat, thorough ventilation, a supply of moisture; and the object of the present invention is to attain these requisites." There must be heat, ventilation and moisture, and then the patent goes on to explain how these things may be obtained in this early device.

The next patent on your chart No. 18 is the Fig. 1 of the patent to Proctor and Knowles, No. 432,282, of July 15, 1890.

Q. Was that one of the structures that we saw over in the demonstration room this afternoon?

A. This particular one is not. That is another Proctor patent. This is Proctor and Knowles. In Fig. 1 and shown on the chart, without referring to the patent, we have two chambers with a channel between containing heating coils. The chambers on each side are divided by a flooring to separate the chambers into two rooms, one above the other. These are rather large, and in the rooms are rails MM, for the suspension of yarn or other material to be dried. When the material is placed in the compartment the air is circulated by means of the fans CC, the device being in duplicate enables the operator to use one side while unloading and loading the other side. The air is drawn backward or forced backward, rises through the chamber containing the tubes, and if the damper K is closed at the top of the device, and the damper G opened, the air continues to circulate, take up moisture, be heated still higher, continues to take up moisture, and finally when it has gotten to the proper [fol. 419] point, if the material within is not dried out, then the damper K is opened and the damper at the left, H, is opened, to allow fresh air to enter. It is also possible to open damper J and close damper I at the bottom so that the air discharged will not pass through the heating coils.

The Court: Had we better suspend at this time?

Mr. Toulmin, Jr.: Yes, I think so.

Mr. Ely: May I make a suggestion, your Honor? May I ask the doctor a few questions?

Mr. Toulmin, Jr.: No, I would rather continue.

Mr. Ely: Then let me say this, there is a dispute here between Mr. Taggart and Dr. Greene as to what actually takes place in the Smith machine filled with eggs, whether the air currents in the machines filled with eggs and operating is as Mr. Taggart testified to in the egg chamber, about 75 to 120 feet per minute. The doctor here has said that his calculations, which I understand are largely theoretical and not done with any actual machine, which show that that air space should be much higher.

Mr. Toulmin, Jr.: That is not correct. He made actual tests.

Mr. Ely: Did you make actual tests?
A. I have made actual tests.
Mr. Ely: With the eggs in the machine?
A. On a similar machine.

[fol. 420] Mr. Toulmin, Jr.: I do not want to have my examination interrupted.

Mr. Ely: As I understand, we are not going to meet here again until Wednesday. Would you mind meeting Mr. Taggart at Frenchtown, New Jersey, on Wednesday, go to that plant. I understand it is the Kerr Company, at the Kerr Incubator plant, go in there with Mr. Taggart and make an actual measurement of what the speed of the eggs should be in the machine there with the eggs in them? The reason I ask that is that in this particular vicinity they have not started the hatching season yet, and while there are some incubator plants around here they haven't got going full blast, and I understand they are going at Frenchtown, New Jersey. They hatch all the year around. So that if the doctor will meet Mr. Taggart whenever he says, they could go over to Frenchtown, New Jersey, and make actual measurements together of the speed of the currents in those machines, then we could have a situation where there would be no dispute and we would find out just exactly what was happening in the Smith machine. I offer that suggestion. Mr. Taggart is ready to meet you whenever you say and go to the plant and make actual measurements.

Mr. Toulmin, Jr.: That is satisfactory to us, your Honor.

The Witness: I would like to point out to your Honor that the machine at Frenchtown, which is quite similar to the one which the defendant has exhibited, is provided with [fol. 421] curtains, but there is no way to make readings behind those curtains. When I made my own test I had to do this, I had to get the anemometer ready, pull the curtain away so that I could get back of it, place it in position—and not the best position, because you did not have time for it. Then get outside and wait for four minutes and get in again and take the readings. The error in starting and stopping such an instrument by pulling eggs out of the road is going to disturb things.

The Court: How are your figures obtained before this?

A. My reading which I have is not a correct reading but it shows much more than 60 and 80 feet.

Mr. Toulmin, Jr.: Dr. Greene, now, to shorten this, Mr. Ely and myself agree that Mr. Taggart will arrange to put an ising glass window in this curtain at Frenchtown, and in that way both of you will be able to look at it and settle that question.

Mr. Ely: We will take this curtain which was here down to Frenchtown.

The Court: We will now adjourn until Wednesday.

(Proceedings adjourned to Wednesday, February 6, 1934, 10:00 A. M.)

[fol. 422] (Proceedings Wednesday, February 7, 1934, 10 A. M.)

(Appearances: Same as before noted.)

Mr. Toulmin, Jr.: Mr. Gillard. Dr. Greene will be here tomorrow morning, your Honor, and I will proceed with my fact evidence.

Lavergne C. Gillard, a witness on behalf of defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

I have been with the James Company, the defendant in this case, twenty-seven years. My duties during the last ten years, generally speaking, have been assistant manager and member of the executive committee which has supervision over all development and experimental work.

All experimental and development work comes under the supervision of the executive committee, and I am a member of that committee. I have particular interest in that personally as a member of the executive committee on behalf of this corporation. I am especially charged with that kind of work. In connection with my supervision of the development and research work, I have familiarity with the expenditures made on behalf of our company for research work in particular fields. In the course of these duties just described, I have had something to do with the supervision of development of the James incubator and hatcher, now the subject of this present controversy.

As to what extent I have had that supervision, from the beginning of our business in 1907 until 1920, we manufac-
[fol. 423] tured a line of barn equipment. Although we started in a small way, we had a few basic patents and pioneered a new line, which was a considerable step in advance of anything that had been used up to that time, and our business grew very rapidly, based on a quality article in these basic patents. Along about 1920 or 1931, the poultry business was coming into its own, and farmers were, many of them, making as much or more money off their flocks of poultry as the dairy farmer was out of his cows. Up to that time we had been supplying dairy equipment, and we had a force of men in the field, calling on farmers and calling on dealers; our product being sold through dealers; and these farmers and dealers were suggesting to us that we should add a line of poultry equipment which could be sold by our regular force of men and through our dealers. Then, too, our barn equipment was a very seasonable proposition; the bulk of our shipments being in the fall of the year, and we needed something else to round out the line, and the poultry lines, feeders, waterers, nests, and so forth, would fit in very nicely with our selling plans.

I had something to do with the supervision and development of the poultry line for all poultry purposes. Up to 1915, that is, from 1909 to 1915, I had been sales manager and naturally that phase of the adding of this line came to my attention and I was a part in formulating the plans and in 1921 the outlook for the sale of these poultry lines was so satisfactory that we decided to bring in a man to head up that division, and we procured the services of Mr. Dann, formerly a professor in Cornell University and also at the University of Wisconsin.

[fol. 424] Mr. Dann is very ill, and he is at Miami, Florida, endeavoring to regain his health. We do not expect him to recover. It would be a period of weeks, if he does.

From along about that same period our men on the road, selling poultry equipment, found that many of these poultry raisers that were buying our products, were hatching for their neighbors and they were using various types of the so-called cabinet small machines and as their business grew, they would add another unit of some small make of machine and that indicated to us there would be an outlet for incubators to that class of farmers and poultry

raisers. That gave us the idea that in adding an incubator to our poultry line it was important that we have a machine that the farmers or poultry raisers could add to, unit by unit, and that is one of the things we had in mind in developing the first machine we turned out, what we call a sectional machine. That machine is being sold today.

We had always sold our barn equipment and poultry lines on a quality basis rather than on a price and in entering the incubator field we had in mind producing a quality chick, not so much quantity as it was a matter of producing a quality chick, and I believe it was in the spring of 1922 that Mr. Dann made a survey throughout the various parts of the country to determine the class of chicks which were being produced by the various types of machines then on the market; many of them sectional and there were a few cabinet machines then and many of these machines were turning out a quantity of chicks, but some of them were not so strong in quality. Mr. Dann found there was one machine which had been on the market, the Mackay, [fol. 425] which produced a very high quality chick, although the hatches were uneven, and we obtained the services of Mr. Mackay to work with our engineer in developing the present sectional machine, not the incubator hatcher, the sectional machine, and it was a case not of going out and copying some machine, it was a case of building a machine to suit our requirements, namely, to produce a quality chick, at the same time having in mind this sectional idea so the machine could be added to as the business of the hatchery man grew.

I neglected to state, in speaking of this development of this sectional machine, that in, I believe it was 1921, and 1922, our Mr. Shodren was assigned to incubation studies from an engineering standpoint. He is our research engineer.

After we got through with Mackay and the development of the sectional machine, the sectional machine was put on the market in 1923, and is still being manufactured. About that same time we also pioneered the idea of a closed ventilated poultry house, in opposition to the generally accepted theory of the open house and straw loft and so forth. We later pioneered the idea of heat in the closed ventilated poultry house. I believe it was from about 1923 to 1925 bacillary white diarrhea spread from East to the West and there was considerable concern about it throughout the

hatching profession, and I believe it was in February, 1926, the American Veterinary Medical Association came out with their bulletin telling about the studies made at Kansas State Agricultural College, which demonstrated the fact that chicks in cabinet machines, infected with [fol. 426] B.W.D., spread the disease to other chicks in the same machine. By the cabinet machines I mean the type of Smith machine here, in which the hatching and incubating are all done in one cabinet.

At that time our men, and also Mr. Dann, were finding in the territory many hatchery men who were using cabinet machines, who were incubating in those cabinet machines and hatching in the so-called sectional machines of other makes, as well as our own, and these hatchery men were reporting to us they were getting a high quality chick; at the same time they were freer from the spread of B.W.D. They suggested to us the idea of developing the separate hatcher machine. At the same time many of these hatchery men or customers of ours, that were using our sectional machines, were growing up, so to speak, in the hatching business, and some of them were becoming cramped for space and they were suggesting to us that we should have a machine which would hatch this same quality chick, and at the same time would occupy less floor space. As a result we set our engineers busy studying a machine which would accomplish that purpose, and our Mr. Markey, who had, with Mackay, developed the sectional type machine, was assigned to the development of this so-called incubator hatcher. In the spring of 1926, Mr. Markey made the first 4200 unit, and this was used in his own home throughout that spring. In the spring of 1927, this machine was rebuilt and used again in his home and later in the season was brought to our plant and we hatched with it throughout the summer months. Then, the next spring we put out the first units in the Black Hawk hatchery at [fol. 427] Jaynesville, Wisconsin, owned by Fred Porter. Then in the spring of 1929, we put out thirteen machines for field tests in various parts of the United States, and this machine was commercially marketed for the first time in the fall of 1930.

In our set-up in our company we have a research department, presided over by Mr. Shodren, and we have a development department for putting research results into practical form, presided over by Mr. Markey.

I have occasion to examine these development and research laboratories and be familiar with what is going on through our shop. To my personal knowledge our company has never, at any time, had a Smith incubator in our shop or in our development department. To my knowledge our men in the engineering or development or shop use have not operated the Smith incubator during the period of our experimental work. So far as my knowledge is concerned, the Smith machine has had no connection with the development of our machine.

We were the pioneers in the incubating business in providing a machine for incubation and another machine for hatching, such as I have just described. In addition to what I have said, this disease question was mainly the principal motive in having these two separate machines. At the same time, we wanted to produce a quality chick.

I have referred to the journal of the American Veterinary Medical Association. This is the volume or issue of February, 1926, journal of the American Veterinary Medical Association, in which we find the article in question entitled "Studies in Transmission of Bacillary White Diarrhea in Incubators," on page 631, and this same study [fol. 428] is written up again in a later bulletin, I believe it was in November of the same year, by the Kansas State Agricultural College. On referring to page 641 of that article in the American Veterinary Association Journal, I find that the following conclusion is arrived at by the scientist who made the investigation:

"That bacillary white diarrhea was disseminated by artificially infected chick down placed in a forced draft type incubator."

That is the conclusion to which I have referred as influencing us in the development of our present machine.

(Defendants' Counsel then offered in evidence the journal of the American Veterinary Medical Association with particular reference to the article referred to by the witness, which occurs on pages 631 to 641, inclusive, and it was admitted as Defendants' Exhibit 66.)

I have just referred to the Kansas State Agricultural College Experiments, which were reported in the American Veterinary Medical Association Journal. The publication

handed me is the November, 1926 Bulletin of the Agricultural Experiment Station, Kansas State Agricultural College, Manhattan, Kansas, and the article in question appears at pages 46 to 49. I find there a similar conclusion to the one just quoted from the American Veterinary Medical Association Journal.

[fol. 429] (Defendants' Counsel then offered in evidence this volume and it was admitted as Defendants' Exhibit No. 67, and particularly pages 46 to 49, inclusive, referred to by the witness.)

In the course of this development work of ours the James Company has spent between thirty-five and forty thousand dollars upon the development of the incubator hatcher we are discussing here in this suit. We still use the hatcher on our sectional machine as an incubator hatcher. In the development of the incubator hatcher, our developing department had in mind the desirability of using the sections of the so-called sectional machines as the hatching section for the incubator hatcher and those sections are still used in that manner.

Our company has either acquired or taken out various patents. Our company owns the Fullington Patent 1,210,445, of November 21, 1916. We have the assignment of this patent. Referring to the patents that have been marked here for identification as Exhibit 49, first I find a patent to J. L. Nix, No. 1,548,478. That is owned by us; also the patent to G. T. Markey, No. 1,751,093. Likewise a patent to G. T. Markey, No. 1,796,872; also a patent to G. T. Markey, No. 1,837,458; and Patent No. 1,939,908, to George T. Markey. These are the patents we are operating under in connection with our present incubator hatcher.

Mr. Toulmin, Jr.: Now, if the Court please, we renew our offer of Exhibit 49 for identification. If Mr. Ely does not withdraw his objection to it, I would suggest that, for a mat-
[fol. 430] ter of saving time, as we have a great deal to do, that we mark it subject to your acceptance after you examine the authorities on the subject, if that meets with your Honor's convenience, without stopping to argue the question here.

The Court: Very well.

Mr. Toulmin, Jr.: I have a memorandum here and am prepared to argue it if you wish.

Mr. Ely: I will just make my objection with the understanding that your Honor will pass on it when you come to the argument of the question.

The Court: That is, the five patents?

Mr. Toulmin, Jr.: Yes, your Honor, that is the five patents. The Fullington Patent is already in evidence. You may have the witness.

Cross-examination.

By Mr. Ely:

We started our development of this incubator that is in controversy here in 1926.

I was ill at the time we purchased the Fullington Patent. I believe it was in 1930, or 1931; 1930, I think. It was purchased after the development of this machine by our people. I do not know on whose advice we bought this Fullington Patent inasmuch as I was ill for 13 months and was away from the office. I do not know whether it was after we had been notified of infringement of the Smith Patent as I do not know the date of that notification. I think the Fullington Patent was found on a search by some of our patent attor-
[fol. 431] neys. As to whether we then went and tried to find Fullington and then bought this patent from him as some sort of anchor to windward, or something of that kind, I am not familiar with those details. I know that the patent was in our name upon my return to work in May, 1931. Whether I had my attention called to the Fullington Patent by reason of the fact that Fullington incubators were on the market anywhere, I don't know. I am not informed whether the Fullington incubator was ever manufactured and sold anywhere. I do not know whether it was a patent on a going incubator that we purchased or whether it was merely a patent which we bought as a possible defense in this case. I am not familiar with those details in buying the Fullington Patent because I was away at the time. I would think we would have some purpose in view in buying patents. Mr. James would be familiar with the reasons for the purchase of that patent. He handled all those matters while I was away. As to whether I am familiar with the fact that we permitted Fullington to testify in the Waxham Case involving the Robbins machine, in California, I am not familiar

with those details, either. That also happened while I was away, ill.

I do not know whether it is a fact that it was customary, long before we started any incubator work at all, to provide incubators with three separate cabinets, to carry on the first period of the hatch in the first cabinet, to move to a second for the intermediate period, and then to move to a third cabinet for the final hatch, as for instance, as exemplified in the Blue Hen Incubator that Mr. Taggart testified to on direct examination. I am not familiar with that fact. This [fol. 432] is not so to my knowledge.

The incubator business is a portion of the total. We have other lines. Barn and farm equipment is a large portion of our business. Our incubator plus our poultry lines, forms quite a portion of the total. It is not half of our business.

These sectional incubators that we manufactured prior to 1926 and 1927 held 180 eggs, I think. This present incubator of ours, that is in litigation here, holds 4,200 eggs a section. I could not tell you how many incubator units of the old style have been replaced by one incubator unit of this new style. Whether 180 goes into 4,200, 23.3, your computation appears to be correct. By making this new incubator, it appears that we have replaced 23 of our old incubator units with one unit here. One of our reasons for getting into this particular type of incubator that is in litigation here was an order to give more capacity in smaller space. It was not one of the reasons that our sale of the so-called still air or previous type had fallen off considerably, due to competition of the so-called forced draft type. That was not a factor at all.

At one time our Concern combatted the forced draft incubator principle.

I recognize plaintiff's Exhibit No. 8 as one of our publications put out by our authority. It is one of our publications. In our 4,200 egg unit I would think there is a saving in labor and fuel over the operation of twenty-three and a fraction of the earlier units. I could not quote any statistics one way or the other as to there being a saving in fuel. Whether our people said that we saved one-third of our fuel costs by operation of this new form of incubator, I am not familiar with the statement. We save fuel in the 4,200 over the corresponding capacity in the old type. Although we might

[fol. 433] not have had a Smith or Buckeye incubator in our plant at the time we developed this, we wouldn't be very good merchandisers if we did not know of the Smith and Buckeye incubators that were out in the field. We knew that both Smith and Buckeye were in the field.

I recall this quotation appearing in our James Way incubator book issued in 1929, as follows:

Mr. Porter says, "Formerly I had to use both floors of my hatchery building for hatching. Now I have increased capacity over previous years and use only a basement for hatching, all giving large capacity and small space."

Mr. Ely: I think that is all.

Redirect examination.

By Mr. Toulmin, Jr.:

Our saving of fuel costs in connection with our new machine, the incubator hatcher, is due largely to the fact that we have insulation on the front, back and sides of our incubator.

We are still combatting forced draft type machines commercially. It is our position that the forced draft machine is not the correct type of machine.

Mr. Toulmin, Jr.: That is all.

Recross-examination.

By Mr. Ely:

We did not have insulation around our other incubators. It was not common practice, to my knowledge, to put insulation around incubators.

Q. Now you say you are combatting forced draft machines, and yet selling forced draft machines. Is that the [fol. 434] way I understand your position?

A. Yes, sir.

Q. You are combatting them on the one hand and selling them on another. In your catalogs do you put your forced draft machines in the front of your modern catalog; look at some of your catalogs and see?

A. Yes, sir.

Q. It is put in the front?

A. Yes, sir.

Q. And the old type is shoved in the back end of the catalog, is that not true?

A. I believe it is listed in that order. That is usually customary with any new construction.

Q. Well, that has been so since you put the new form of incubator on the market, has is not?

A. You mean the old type?

Q. It has been true since you put this new incubator on the market; you have put that on the front portion of your catalog and have devoted most of your catalog to that?

A. Yes, sir. It would be customary to bring a new device in the front of the catalog.

I am not sure that has been during the whole period from 1927-1928. I do not know that it has been the whole time since that incubator has been on the market. The incubator hatcher is shown in the different catalogs here, in the front of the book. The latter part of catalog is devoted to the old form.

As to why we spent thirty-five to forty thousand dollars developing this form of incubator that we are still combatting, we claim, for our incubator hatcher, features and benefits not claimed for the so-called section machine, the forced draft machine, such as in litigation.

Mr. Ely: That is all.

[fol. 435] Redirect examination.

By Mr. Toulmin, Jr.:

Q. Mr. Gillard, did I understand you to say that your present incubator hatcher is a forced draft machine? Did you mean to say that?

A. No, sir.

Q. In response to Mr. Ely's question, whether it was, did I understand you to say that our present incubating machine was a forced draft machine?

A. No, sir.

Q. Did you mean to say that?

A. No, sir.

Q. You meant to say you are still combatting the Smith type of forced draft machine, is that correct?

A. Yes, sir.

Q. And that your present machine is not a forced draft machine from your point of view?

A. Yes, sir.

Q. And that is the policy of your Company?

A. Yes, sir.

JAMES G. HALPIN, a witness on behalf of Defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

I am Professor of Poultry Husbandry, University of Wisconsin. As to my educational qualifications and my subsequent experience, particularly with reference to poultry, I graduated at Cornell in 1905 under Professor Rice, and went from Cornell, after graduation, to Rhode Island Experiment Station at Kingston. That was in 1905. Then, in 1906, I came up to Michigan Agricultural College, now the Michigan State College, at East Lansing, Michigan; and then, in 1909, I went to the University of Wisconsin as head of the New Poultry Department, and have since been there.

In the course of my official duties in these several institutions, particularly at Wisconsin, I have had something [fol. 436] to do with the incubation and hatching of eggs. We have used a good many different kinds of incubators, especially small incubators. We have also used the Candee, and Petersime and James Way. We practice what is known as separate hatching, in our hatching work at the University of Wisconsin. A large proportion of our eggs are hatched in the old style James Way, and in the hatching compartments of the new old style James Way and in Prairie State incubators. The eggs are hatched, for the most part, in separate pedigree hatching capacities because we are an experiment station, not a commercial hatchery. We do the incubating down in the cabinet of the James Way, have for the last three seasons. This is our fourth season doing that. We follow a system of separate hatching and separate incubation because we believe that that is the most satisfactory method. One important reason for that belief has to do with the possible dissemination of white diarrhea, as shown by the work at Kansas. I am familiar with these two

publications that Mr. Gillard has just referred to from the Kansas Institution of the American Veterinary Medical Association.

The basic requirements for the incubation of an egg in any machine, you have to have correct heat, ventilation, moisture, and exit of foul air, which is included in ventilation. Entrance of fresh air is not included in ventilation. These factors of heat, temperature, and ventilation are factors that were known to me prior to 1915, and have been known for a long time. In the older books you will find reference to the importance of correct degree of heat and [fol. 437] correct ventilation. One of those old books where such teachings are given, of which I have here a copy, is De Reaumer's Book, Exhibit No. 27, a book that we use as reference in the history of incubation. This book was published in 1750. I have had this book for something over 20 years. We use it as a reference book in our course in incubation and brooding. That is Course 5. And then in our course on advanced poultry management, Course 107. We have been using that book in those courses more or less for the past 20 years. You have occasion to give more references to this type of work some years than others. It has been used, not as a text that the students buy—of course, the book is not available—but used as a reference text. The date of the copy that I have there, printed copy, is MDCCL.

The author of that book describes very nicely an Egyptian type of incubator, describes incubators he built over baking ovens; and then he also describes incubators that he built using heating vegetable matters. Then, in the fourth part of the book he describes the matter of feeding chicks and raising chickens, and that sort of thing. In the light of my own experience, I find the teachings in this book to be practical and correct so far as the incubation part is concerned, it is surprisingly good. So far as the feeding, nutritional part in the back of the book—it is before the day of the discovery of vitamins and so on, and it is merely of historical interest. In the incubation part of the book I find the teaching of the arrangement of eggs in large numbers in different trays, superimposed one over the other. He describes the Egyptian incubator, shows a central alley- [fol. 438] way and one layer in one room and then in another room, one above the other. I refer to the illustration

opposite pages 47 and 48 where I find this to be the case, where this illustration occurs. Yes, I have 47 here.

I find, in connection with this book, a teaching of the necessity for uniform temperature. There are a number of places where that is emphasized especially in some of the experimental work he did over the bake-shops. It might take me a minute to find that. The work that he did, hatching chickens over bake-shops, there are a number of places where he mentions it. On page 50 he has an incubator that was successfully built over a bake-shop, the baking ovens of the Society of L'enfant Jesus. Referring to the following plate 4, page 51, and plate 5, page 51, there is a very nice illustration of having eggs in various trays, one over another. It is Fig. 3, showing the three trays of eggs, one above the other. Fig. 2 on the preceding page shows five trays of eggs and a place for still another one, I think. That car with the trays one over the other is placed in the heating room over the bake oven. Plate 5 represents, at the upper left-hand corner, a place that he fixed for incubating the eggs. This arrangement, Fig. 3, below, is taken up and moved into the hatching room. I think that is b.

The Court: b corresponds with the places indicated on the other Fig. 2, does it not rr?

The Witness: Your Honor, I did not find b.

[fol. 439] The Court: You just referred to it in Fig. 1.

Q. Fig. 1 is in the middle of the page, Professor?

A. Oh, excuse me.

Q. This Fig. 1, his Honor is referring to.

The Witness: Oh, yes.

Passing on further in this book I find the teaching as to the use of thermometers for keeping temperature uniform, or observing temperature so that you can keep it uniform. The author emphasizes the importance of having a correct thermometer; and some place in here he is very sorry to say that some thermometers are on the market that have his name but he did not make them, and he emphasizes the fact that thermometers must be correct if successful incubation is to follow. Referring to page 147 and the illustration opposite to it, I find an illustration there of the thermometers he discusses in the text. Fig. 1 and Fig. 2 are thermometers.

I find in that figure a plurality of trays, one over the other, with eggs in each tray. These trays are made of wicker, which are like our wire trays today. He also shows there two systems, in one of which egg baskets are suspended, and in the other of which he has four handles on the basket, and puts the one basket of eggs on top of the handles of the one underneath. Referring to Fig. 3, when they cannot afford a real thermometer, they melt fat, butter and lard mixture and put it in the bottle, and then put that bottle in the incubator, and if the incubator is the right temperature that fat will be so it will flow but slowly. [fol. 440] Referring to page 130, the text along the middle of the page, we have used that reference in our teaching to show that even back then they knew that there was a very decided difference in the behavior of the developing embryo to excessive heat. As has been frequently pointed out, excessive heat during the earlier stages of embryonic development results in extremely rapid consolidation, extremely rapid growth; whereas, if excessive heat occurs at the last state, somewhere after the 17th or 18th day, after the chick becomes more like a warm-blooded animal, then the excessive heat has a tendency to delay the hatching because the chick is behaving like a warm-blooded animal, due to excessive heat and becomes slowed down in his actions.

As to whether I find any teaching in this book about the use of forced draft in connection with the groups of eggs in an incubator for the purpose of maintaining temperature and moisture conditions, somewhere in here he mentions the use of a fan and he mentions the use of bellows. It is on pages 184, 185 and 186. With reference to page 212 and the plate opposite to it, he was having trouble with excessive moisture and lack of ventilation, and so they introduced the arrangement shown down in the corner of Plate 8, and then by means of a fan or bellows, they could drive the air up through the barrel. In that barrel, as illustrated opposite Page 147, there were arranged various trays of eggs, one over the other. In the view shown opposite to 212, Plate 8, we have various trays of eggs that are shown on little carts that are placed in the main incubator building. There is a movable table that the eggs are pulled [fol. 441] out onto when they wish to turn them. They turned eggs and they controlled their temperature, they had forced draft and they controlled their moisture, as taught

by this book. The eggs were arranged in superimposed bodies, one over the other.

We use this book for the purpose of teaching our students at Wisconsin the fundamentals of artificial incubation, especially in the historical development of incubation. I think this is a classical book along that line.

With reference to the actual practice prior to 1915, in connection with incubation, I have here Professor King's book. Professor King was a professor at the University of Wisconsin, Professor of Soil Physics, quite a noted man, developed the King ventilating system, silo, cowbarns, and so on. He made a trip to China, and Japan, and Korea, and so on, and came back and wrote this book, which was published in 1911, and called "Farmers of Forty Centuries, or Permanent Agriculture in China, Korea and Japan." The copy I have is the Wisconsin University's copy because one of my students has my personal copy at home. I supposed I had my copy, but I brought this one. I have been familiar with this book, I should say, since 1911 or 1912, because I knew Professor King quite well. My copy is the one Professor King gave me.

On the subject of incubating and hatching, especially with reference to separate hatching, I refer to page 178. He shows a picture in a Chinese hatchery, four Chinese incubators in a room where there are thirty, each having a capacity of twelve hundred hens' eggs, and the eggs are put into thirty of these incubators arranged in two parallel rows of [fol. 442] fifteen each. Immediately above each row, and utilizing the warmth of the air arising from them, was a continuous line of finishing hatchers and brooders in the form of woven shallow trays, with sides warmly padded with cotton and with the tops covered with sets of quilts of different thicknesses. That teaches me as to the practice in China with reference to the use of separate hatching, that when they incubate the eggs, they put them in these incubators, and put them up in this contrivance above to hatch them. I, myself, in our own hatching work at Wisconsin, practice this same principle of separate hatching.

As to the physiological reasons for separate hatching, during the latter part, after the embryo becomes more like a warm-blooded animal, its requirements for oxygen are increased, and it is also highly important that the egg be kept moist. Many of the small incubators we had years

ago were a failure because of so many of the chicks would dry and stick fast during the hatching period. As to the period of maximum mortality for chicks, so far as incubation and hatching periods are concerned, ordinarily you have a tendency to have two peaks, one occurs sometime during the first four days, and the other peak occurs during the last four days. As to which is the larger peak of the two, it is highly variable in our experience, owing to what type of deficiency you happen to be working with and how extreme this deficiency is. I refer now to our work on various vitamin deficient rations fed to hens and so on which has occupied a good deal of my time during the last year. One of the most important periods is the last three [fol. 443] days, so far as mortality is concerned. I think that is the result of most investigators, either you have two peaks, one in the first part and one in the last part of the incubation period.

The Court: It appears from this publication here the eggs are kept for eleven days in one lower incubator and for ten days in what they call the finishing tray, so they divide them there, evidently, into two periods, is that it?

A. That is it, yes. You will find Reamer tried a number of different methods.

By Mr. Toulmin, Jr.:

Q. Of separate hatching?

A. Yes.

The Court: This is the system that is recently employed amongst the Chinese?

Mr. Toulmin, Jr.: The date of that book, I think, your Honor, is 1915.

The Court: 1911.

The Witness: 1911, but this is an old, old custom in China, it goes away back.

The Witness: I have had occasion to take prior heating and ventilating patents and have built constructions in accordance with them and then attempted to incubate eggs in those heating and ventilating structures. What I call No. 1 is the J. K. Proctor apparatus for ordering tobacco and its number is 553723, Defendants' Exhibit No. 61 down here in the demonstration. We built this Proctor machine,

finished it August 29th, I believe. At any rate, we put [fol. 444] eggs in it on August 30th. I have here the photographs so that I can identify the structure. This is the outside of the machine. In order to identify it on the official exhibit No. 58, the first group of photographs represent the machine in which I did the work. We put eight trays of sixty eggs each on the rack shown in this third photograph.

The Court: On the left-hand side.

The Witness: Well, we put part of them here and part of them here (indicating), and of those 480 eggs, there were 135 infertile, which gave us 345 fertile eggs, from which we hatched 231 good chicks, so that we hatched 66.9 per cent. of fertile eggs.

The Witness: I think that is the satisfactory commercial hatch at that time of the year. I was doing it in September, 1933. The hens were moulting and fertility was low, and at the same time you do not get quite as high a hatchability as you would like. The normal season of the year to do hatching, with us, is March, April and May. The average weight of the chicks was 8.25 per hundred, for the trays located on the left-hand side, and 8.36 for the trays on the right side of the machine. We consider eight pounds per hundred standard for good chicks thoroughly dry and these chicks were thoroughly dry when we weighed, in fact, the Wisconsin regulations require that they weigh eight or more. These chicks weighed more than eight pounds; 8.25 and 8.36. We examined the chicks for com- [fol. 445] mercial quality and considered them satisfactory commercial chicks. In my judgment they were satisfactory commercial chicks and we kept them and brooded them for two weeks with only a small loss. I had never attempted to incubate and hatch in this particular machine before we made this test. All we did then was to put the eggs in the machine and let it go. We put the eggs in on August 30th, September 3rd and September 7th, but we were unable to finish hatches that went in September 3rd and 7th, because the machines were taken away and shipped down here.

The Court: How were the trays separated?

The Witness: We put tags on each tray.

The Court: I mean separated as between themselves.

The Witness: Well, a slide arrangement, so they slide right in, one above the other.

The Court: I thought there was a larger separation.

Mr. Toulmin, Jr.: They were placed in racks somewhat like the one shown a minute ago.

The Court: The same racks used for drying tobacco.

The Witness: No, in the tobacco machine they show those racks farther apart. We simply put cleats in there and substituted——

Q. You substituted for the rods where the tobacco hangs, the egg trays slid in on shoulders?

A. Yes, sir.

[fol. 446] The Witness: I was there when the eggs went in and was there several times during the progress of hatching, was there and candled out the infertile eggs; was there and unpacked the chicks after the hatch was complete. I simply showed up there without appointment, they did not know when I was coming out, whenever it suited my convenience to get over there and to look and see what was doing. The James people were not always present when I was there. A number of times I was in the place without seeing any of them that I knew. I was present when those photographs were taken, that I have been referring to here.

I have here my original notes that I made of these tests so they can be put in evidence if necessary. Everything else is here. This is simply the note book I carried with me. It has a lot of records of egg hearings and various other things in here, just a working notebook showing what I did each time. I have kept in that notebook the records of other tests of other machines I am now going to describe. They are all here from day to day.

I will now take up the second machine, made in accordance with the second patent. That is the C. W. Schwartz, Jr. method of and apparatus for ordering tobacco, Patent No. 535,175. This particular machine in question is the one marked 62 over in the store room. We made an internal truck arrangement for holding the eggs, similar to the one in the Proctor machine. We substituted for the rods and tobacco hanging down, sliding trays on the same [fol. 447] trucks, and simply slid the eggs in the same as we did in the Proctor machine, and on August 30th we put

in nine trays of sixty eggs each, five hundred and forty eggs. Of these 540 eggs, 109 were infertile, leaving us 431 fertile eggs and from these 431 eggs, we hatched 313 good chicks. That is 72.6 per cent. of the fertile eggs hatched. These chicks were a little bit heavier than in the other machine; they weighed 8.89 per hundred, the chicks on the left-hand side, and 9.08 per hundred chicks on the right-hand side. We also had three trays of eggs we put in the Schwartz machine on September 3rd, and three trays put in on September 7th, but we were unable to finish, so we simply candled them and transferred them over to other equipment, and that is all we did.

We took photographs of this machine, both as to construction and as to the stage of setting, incubation and hatching. I have my copies here. We refer now to Exhibit 58, the second group of photographs. I was present when these photographs were taken, and was present when the eggs were set. I made visits at unannounced intervals during the progress of incubation and hatching. I had something to do with the actual taking off of chicks from the hatch. I actually candled the eggs to remove the infertiles and unpacked the chicks shown in the photograph. I have here, in my original notebook, the record of the various pieces of data that I took off as this test progressed.

No. 3 is the G. E. Goldstein apparatus for curing and artificially aging cigars, and it is No. 1,137,752. The Goldstein machine is marked Defendant's Exhibit 63 over there [fol. 448] in the warehouse. On August 25th, we transferred two trays of eggs into the bottom spaces of the Goldstein machine after we built it. These two trays consisted of 188 eggs each, or 376 total eggs originally. From these 376 eggs we had candled out 87 as infertile, leaving 289 eggs that were transferred to the Goldstein machine and they gave a remarkably good hatch of 243 good chicks, which was eighty-four per cent. of the fertile eggs hatched. One hundred of these chicks weighed 8.45 pounds and another hundred weighed 8.26 pounds. The commercial quality of the chicks was satisfactory.

The commercial quality of the preceding chicks was satisfactory and the livability satisfactory on a two weeks brooding test.

On September 15th we took four trays of eggs which had been previously incubated in another machine and divided them equally into four trays of one hundred forty

one eggs each. That is, one tray we marked G-1 which we placed in the Goldstein machine and another we marked G-2 which we placed in the Goldstein machine. From the 141 eggs in trays G-1, we hatched 127 good chicks that weighed 8.52 pounds per one hundred chicks. Of the 141 eggs, fertile eggs, placed in tray G-2, we had 125 good chicks which average 8.33 pounds per 100 chicks. Then on September 10th we had placed 384 eggs in the Goldstein, which had to be transferred ten days later. We also put on September 12th, 141 eggs into the Goldstein which had to be transferred eight days later. I merely handled those eggs and found a satisfactory development in them and that is all. We stopped at that point because they took the machine away from us, to ship it down here to Court. [fol. 449] This run and that of the previous machines were during September, 1933. Eggs were started October 25th for that first Goldstein and eggs went in the incubator on August 28th for the second Goldstein hatch.

In my judgment as a professor of poultry husbandry, and a man who has had some practical experience with it, I would regard the hatches from these three machines satisfactory. Those are all the tests I have of those three machines, the Schwartz, Proctor and Goldstein. That is all I have conducted. They were not proceeded by preliminary tests. We placed the eggs in as soon as we could get them heated.

I was present when the photographs of the Goldstein machine, in Defendants' Exhibit 58, were taken. I was present when the hatches were taken off the Goldstein machine. I was present when the eggs were put in. I went to see the machine from time to time during the period of incubation and hatching.

As to setting the eggs in all three machines, in the Proctor machine, that was No. 1, we put in the eight trays on August 30th and then two trays on September 3rd and four trays on September 7th; and the Schwartz machine we did much the same thing except that we put in nine trays on August 30th, three trays on September 3rd and three trays on September 7th.

The Court: Did you turn these eggs by any means?

The Witness: I turned the eggs in the Proctor and Schwartz machines by pulling the carriage out and turning them by hand. We just rolled them in the trays.

[fol. 450] In the Goldstein machine we found it very easy to bore holes in the side of the machine, run a rod through and we had a very nice arrangement in that we could just put the eggs in a James Way incubator tray and push the rod through, which turned the eggs at one time, and go around on the other side of the machine and push the rod back in the opposite direction and turn them the next time; so in running the Goldstein machine we did not have to cool the eggs or handle them in any way at all.

The Witness: We have run tests on the James Way incubator, in connection with that James Way machine, without the front and back partitions forming the false back and false door.

The Court: You mean closing those so that there would not be any circulation through there?

Mr. Toulmin, Jr.: Taking off the two boards which your Honor will see in Exhibit No. 34, removing these two boards which constitute the false door and false back, at this point.

The Witness: On December 15th we put 102 eggs in the James Way from which we had just removed the inside partitions that form the air channel, those two boards, the one on the front door and on the back, took them out, and of the 102 eggs, 14 were infertile, which left 88 fertile eggs, and we got 73 good chicks, 15 dead and pips. We hatched these chicks after we incubated them in this machine in the regular hatcher. We followed the same procedure in [fol. 451], this as we do with the James Way ordinarily. They were simply in this 18 days. Then they were moved over to the hatcher and hatched in the regular way. Then, we had another section of a James Way in which we took off the boards in the same way and we put a piece of cloth to cover the first couple of trays. That cloth was about six or eight inches deep. For instance, that just hangs down enough to cover the two upper trays.

The Court: The top, you mean.

The Witness: The top and in that machine we also put 102 eggs. There were 13 infertile, leaving 89 fertile eggs and we got 77 good chicks.

The Court: What is your claim for that? In the other machine the curtains are on the bottom two layers.

Mr. Toulmin, Jr.: The curtain in the Smith patent goes clear to the bottom.

The Court: I mean the curtain in this little vault between the trays.

Mr. Toulmin, Jr.: What we claim for that is that it shows in addition to having those boards there for forming an air chamber, for insulation, following up what the other witnesses said, you can ultimately get a hatch out of a James machine with or without those boards, that the air travels down to the bottom, is turned by the turbulator in either event.

The Witness: We had 77 good chicks out of 89 fertile eggs, which is 86 per cent. of the fertile eggs. I have a record of that in my notebook. I supervised these two [fol. 452] tests of the James machine, as I did the other tests.

Defendants' Counsel then offered in evidence this notebook and it was admitted as Defendants' Exhibit 68.

The Witness: Nobody else can read it.

Defendants' Counsel then offered in evidence the photostatic copy of the title page and pages 178 and 179 of Dr. King's book, "Farmers of 40 Centuries" and they were admitted as Defendants' Exhibit No. 69.

The Witness: I have had communication with a Mr. Hastings, at various times, especially years ago, numerous communications, along during, I should judge, 1908, 1909, 1910, 1911 and 1912. Those communications were mostly by letter. I saw a publication at that time describing Hasting's work. About 1912 I think there was in Popular Mechanics, or some of those magazines, a story published of the incubator that he constructed and on or about that time he had sent me a record of the work that he had done in making a Mamoth incubator. These communications I had have been destroyed, as have a great many of the old records from our department. I think I would recognize those publications. The photostatic copy of the publication, the original of which is here in Court, "Popular Mechanics" magazine, particularly pages 630 and 631, numbered as Exhibit No. 24, is one of the publications I saw

in connection with Hastings in 1911 and 1912. There was a mimeograph or stencil letter by them in regard to it.

Mr. Toulmin, Jr.: That is all.

[fol. 453] Cross-examination.

By Mr. Ely:

Now with respect to these experiments we made in the James Way machine here, we took out the inner boards that constitute those corridor partitions or passage ways in the standard James Way machine and we put in the chamber that had been altered I think, 102 eggs. The capacity of that chamber when it is filled is approximately 2100 eggs. This experiment we made with 102 eggs was in a chamber which normally holds 2100 eggs. That was only a portion of a tray of eggs, just a small portion of one tray of eggs. Those 102 eggs were set all at one time. We took the air channels off from both sides then we put the short curtains down on the one and could not on the other and we just took the eggs as they came out of the crate, as the farmers brought them, and put one in one tray, and one in the other and slid those trays in there.

We took two trays, one went in on one side and one on the other, and we sorted our eggs by putting one egg into one tray and one into the next and so on so as to get an even distribution of the eggs. We set all 102 eggs in one day. We put 102, if that was the number, we put 102 in one tray and 102 eggs in another tray, and we slid one of these trays into this compartment with the short cloth hanging down and the other end did not have the cloth. At the time this experiment was made, we had altered the compartment by removing the partitions altogether, and we altered the other compartment by removing the partitions and putting curtains down from the top. At that time we had 102 eggs in one side and 102 in another side, that is 204 eggs in [fol. 454] the whole machine. The capacity of the whole machine, approximately, was 4200 eggs. Our experiment was made with 204 eggs in a machine with a capacity of 4200 eggs. Those eggs were all set on one day. We did not have a condition there where the cabinet was full of eggs as in normal operation. We did not have eggs set at various stages of incubation. They were placed in the upper part

of the chamber, next to where the curtain was to come, the top two layers. We did not place these eggs in the lowermost trays. All egg trays were right opposite each other, at the same level.

We kept them in that position during the incubation period and then on the 18th day we took them over into the Jamesway hatcher, that is into the two Jamesway hatchers, took them off these trays with cradles in and put them on flat trays and put one group into one hatching space and another group in the other hatching space. We did not make any similar experiment with the incubator full of eggs, with the regular complement. What would happen if we had that situation, I could not say. We did not make any other changes in the incubator for these experiments. We simply removed that board arrangement in the back and in the front and put curtains in on the one side.

Q. Then your experiment was really of no value to determine what might happen if you tried that sort of an arrangement with the incubator full of eggs, in other words, you did not find out what would happen in that case?

A. We did not run it full of eggs, no.

The Witness: As to how close we placed the crate holding the eggs to the side walls, on account of the turning [fol. 455] device we put it right back into its regular position. There is an iron rod goes through and you just push the turning device with two fingers which hook onto that iron rod. The edge of the tray would be about three inches, a little more, perhaps, somewhere around three inches from the wall. It would not be more than that with the partition out, not the way we did it, because there was a piece that went up and down and that we did not bother to remove. We just simply took off the inside bolt, so that the insulation stuff that forms the inside of that channel is, as I remember it, about a half an inch thick, and that is what we removed.

I have a copy of the Proctor patent, 553,723, before me. The mechanics there in the James Company built these various machines, the Proctor, the Schwartz and Goldstein machines I have been testifying about. As to having anything to do with superintending the building of the machines, I did and I did not. I was in the shop two or three times while they were building them, and what I did was simply

to turn this set of plans over to the shop and they went ahead and built them. I did not check the machines after they were built to see if they were in exact conformity with the structure shown in the patent. I think I simply saw them done. I do not know whether these experiments made in the Proctor machine were made with a machine identical with the showing in the Proctor patent, but they were built by good workmen. I know that those machines were like the machines shown in the Proctor patent. I would hestitate to say any two things on earth are identical. The [fol. 456] process of ordering tobacco to which the Proctor patent is directed is a matter of getting moisture in the tobacco so that it will be in the condition they want. It is a process of putting moisture in tobacco that is too dry. Moisture is put in the tobacco so that it can be handled without crumbling. As to it being a process peculiar to that particular industry, the tobacco industry, I believe that perhaps some other industry—I cannot recall now—that is entirely out of my line.

In incubating eggs we like to have a loss of approximately thirteen per cent. of their weight during the eighteen days of incubation. That loss of weight is due to evaporation of water in the egg. Water is not added to the egg in the process of incubation. You must permit some water to evaporate. In the process of ordering tobacco, you are adding water to the tobacco.

In this Proctor machine in which these eggs were incubated we applied heat. We had some heating mechanism. I do not find any reference to a heating mechanism in the Proctor patent. We simply put electric heating rings in that machine to bring it up to the temperature we wanted. As to changing the machine of the Proctor patent by putting heating mechanism in it which is not in when ordering tobacco, I think that is right. In that respect the process of ordering tobacco is different from the process of incubation.

In incubating eggs, a certain amount of fresh air has to be supplied so the embryos can breathe through the shells. You have to carry off carbon dioxide. Tobacco, in ordering, probably does not breathe oxygen and throw off carbon dioxide. When you order tobacco, dry tobacco does not [fol. 457] breathe oxygen and give off carbon dioxide. That is not found in ordering tobacco. I do not find any refer-

ence to the admission of fresh air to the machine. As to this being another respect in which we have changed the machine of the Proctor patent in order to make it hatch eggs, the only provision we have when running the machine for the entrance of fresh air was the channels the track runs on because actually we did not close them up. That was where the air got in, some leakage around the doors.

The patent shows where the wheels run on that track and in order for wheels to run on that track you must have an opening there. You must have an opening for that wheel because the track, in order for that wheel to run on that track, there must be an opening there. You open the door when you wheel your carriage out, but you could not bring the bottom of the machine up smack against that track, because the flange on that wheel sets over the edge. Whatever opening might be there would be purely accidental as far as the operation of the machine of the patent is concerned. There is no purpose shown in the patent and nothing said in the patent about any fresh air getting in.

There is nothing said in this Proctor patent about setting eggs, or about setting eggs in stage incubation. I was looking over some of these different patents with a group one day, and I said, "I bet we could fix those up and hatch eggs in them all right", and that is what we went ahead and did.

Q. Are you aware of the fact that in some of these other cases they have put in the same sort of testimony and the [fol. 458] patent has been held valid over it, are you aware of that fact?

A. I am not aware of that fact.

I never tried the experiment of taking this Proctor machine, of patent 553,723, and putting eggs in one compartment and tobacco in the other, and then running the machine, ordering the tobacco in one side and incubating eggs in the other. As to what would happen to the eggs if you had a machine running for ordering tobacco, I would have to try it to see. You would not hatch eggs under such conditions without heat.

Q. If you ran the machine described in the method of operation, you could not hatch eggs in it?

A. I could not hatch eggs without heat.

The only ventilation we had was what came in there. We had to add heat.

The Schwartz patent is for ordering tobacco. It must have heat for incubating purposes. In the Schwartz patent there is some provision for putting excessive humidity in the air. The air is driven down over this arrangement so that the air will become extremely moist and it circulates around and up through. Schwartz describes the use of a cool draft of air and having that cool draft of air come in contact with a warm body of water so excessive humidity will be put in the air. The purpose of the Schwartz patent is to add moisture to the tobacco in the process of ordering. In the process of incubating eggs, the idea is to permit the eggs to dry out slowly in the incubator. To incubate eggs in the Schwartz machine we could not use the amount of moisture they do in ordering tobacco. That is one of the principal differences between ordering tobacco and incubating eggs.

[fol. 459] I do not think there is any statement in the Schwartz patent about the need for fresh air in that machine. The Goldstein patent is for a machine for putting moisture into cigars.

In the Goldstein machine over in the warehouse when we looked at it the other day they had two ventilation openings in the back, slides, very similar to those used in the James Way machine. I do not find those anywhere in the Goldstein patent. Referring to the picture of the Goldstein machine, I am not positive whether the proportions of the fan in the Goldstein machine follow the proportions of the fan as shown in the patent. On comparing Fig. 1 of the Goldstein patent with my photograph of it I find we have in that Goldstein machine as built, a much larger fan than shown in the patent.

Q. What is the size of the fan in that?

A. Well, I don't know, it is a 12, it is a multiple bladed fan, it is a several bladed fan. My memory—I have not looked at that in weeks, but my memory is it is 12 or 14 inches.

In the Proctor and Schwartz machines we carried the process of hatching through to a conclusion. The first batches of eggs that were put in were carried right straight through, but there was no complete run from the beginning clear through to the finish with the Goldstein. With the Proctor machine, the record shows, as I gave, that 480

eggs went into the machine on August 30th and they stayed in the Proctor machine until the hatch was finished. They were not taken out and put in the James Way hatcher, not the ones in the Proctor, nor the Schwartz; that was true of the no air channel and the short air channel.

Mr. Rinsell, our engineer, says there is no fan in the [fol. 460] James Way machine. He says there is a propellor at the top of it and a turbulator at the bottom. I don't know the size of the propellor at the top.

With regard to the book "Farmers of 40 Centuries", in the operation described in this book, eggs are placed in some baskets or large wicker hampers or something of that kind, as shown in the picture on page 178. Heat is applied by the burning of charcoal. The eggs are kept in those baskets for only eleven days. As described in this publication, at the end of the eleven days, the eggs are transferred to the trays where they are hatched. It says that on page 179.

I taught my classes that the developing embryo gradually absorbs less and less heat and that up to the eleventh day it is not giving out so much. Those eggs in the hampers beneath would not be giving out any animal heat. They would be absorbing heat. When this pamphlet or booklet says that the eggs in the upper tray are utilizing the warmth of the air arising from the basket, they are talking about the warmth of air generated by the charcoal burner or whatever they have in there to furnish heat. This operation, described in this publication, is not using the heat of the embryos in the latter stages of development to supply heat for the embryos in the earlier stages of development.

Recess until 2 P. M.

Proceedings After Recess, 2:00 P. M.

This old book DeReaumur published in seventeen hundred something, on the art of hatching and bringing up [fol. 461] domestic fowls, starts out with a discussion of the methods of hatching used by the Egyptians on the Delta of the Nile. He mentions people that went down there, made trips, and came back with information concerning what the Egyptians were doing.

The Cult that engaged in the hatching of eggs in Burma kept their process more or less secret among themselves.

It was handed down, as I understand it, from father to son, by the Burmians, so the secret of operating these ovens was handed down from generation to generation.

I think this book, in discussing the Egyptian process, discusses what had been pieced together by information received from various sources. It says that so far as he had been able to find out, the Egyptians carried on the process in what they call large ovens or what they called Mammals. I recall those Mammals, as he described them, or ovens, were arranged perhaps in large rooms or houses, because there was a horizontal partition dividing the room into an upper and lower floor, with a passageway in the center and then these places for the eggs at two different levels on either side of this central passageway.

As far as they have been able to find out, the process of hatching consisted of placing eggs in chambers all at one time at the start.

They applied heat, built a fire of dried camel dung and other material. That heat was applied to the chamber for a certain number of days, about half the hatching period. First I think they carried it around somewhere near the twelfth to fourteenth days of incubation. Then the Egyptians, as far as he could find out, put the fire out and spread [fol. 462] the eggs, took some of the eggs from the lower floor up and put them out on the upper floor and let them hatch there, spread the eggs out, in other words. That is what he found in his investigation of the Egyptian process, substantially so. They have a very mild climate there and could do things we could not do here.

As to the Egyptians being very successful in that process they carried on, I believe several times here the statement is made that the operator of this mammal or egg oven was supposed to return two chicks for each three eggs brought in.

It was a very profitable business as carried on by these Burmese. I think that was what inspired this man to go ahead with his experiment on artificial incubation. He was seeking to duplicate in France things done by the Egyptians on the Delta of the Nile. He claimed to have had some very good hatches with some of his machines and especially that he heated with heating horse manure and other decaying vegetable matter.

I remember he said somewhere here that he was doing as well with his machines as he was with the chicken hens as incubators. The book says (p. 191): "I have kept for that time an exact account of the eggs I have given my hens, and of the chickens hatched out of them, but I think I have had more unfortunate broods than is customary to have and that the accidents against the experiment have been more frequent and in greater number with me than they generally are. The product of chickens for each of these years has been less than a third part of the number of the [fol. 463] eggs; but I think in general, that it will not be underrated, if it is allowed to be equal to one-half of the quantity of the eggs sat on; it is well proved at least that it ought to be rated under the two-thirds of the number of eggs, supposing that the products of the Egyptian ovens have not been underrated."

That indicates to me that he never reached the perfection which the Egyptians had, in his whole life, but I think it would be expected, because under his climatic conditions, his eggs would not be likely to hatch as well as you would get down there on the Delta of the Nile. Whatever excuse or reason, he states here during the whole time he got less than one-third of the number of chicks out of the eggs.

I think that is substantially borne out, he says he does as well with his incubators as he does with his hens.

He only got about one-third production with his hens. As near as I can read, he just about had tied with his hens and incubators. He did not approach the success of the Egyptians. When he first started out trying to duplicate the results of the Egyptians on the Delta of the Nile, he started out using bake ovens. In hatching eggs in those bake ovens, I think he had quite fair success at the one place where they baked frequently. Other places, I am saying this from memory, where they baked only, maybe, couple of times a week or something like that, he was not so successful.

He was experimenting the whole time with the use of bake ovens, trying to imitate the Egyptians. He was using the surplus heat from bake ovens in this work. As to whether he continued that, or went on to another scheme [fol. 464] after his bake oven experiments, as I understand the book, he was carrying out the two at the same time.

For instance, at this one place where he was using the heat of the bake ovens, the nuns also had his other kind of incubators at the same time, so that he was running both at the same institution, the bake oven incubator and using these incubators that at that time he made out of casks, so that he had them both going. I think in one place he says that the sisters favored the decaying vegetable matter casks to the bake ovens.

I take it that the bake ovens were not the last word, as far as he was concerned. He apparently was much more interested and spent much more time apparently in building these incubators to be operated with decaying vegetable matter, and he takes up a good deal more space of the book in that. As to whether in those experiments he performed in the bake oven he used stage incubation, I have not looked for it in the book.

In those experiments on the bake oven proposition, he did not use a fan. As I read the book, he was carrying out experiments of the bake ovens and the casks at the same time. He carried on the experiment of hatching eggs in the barrels. He hung eggs in the barrels and sometimes hung straw in the barrels. He put the barrels over and then surrounded the barrels with this decaying vegetable matter, horse manure. He covered these barrels in a deep bed of horse dung. He got his heat from the heat of the decaying horse manure or other material he used. When it got cool, he added more of what he called hot [fol. 465] manure. If it got too hot, he covered up this pile of manure with planks and one thing and another to cut down the fermentation. He did not get very good results at the first; he had excessive moisture. He found he had a lot of chicks dying in the shells. He attributed that to the smell of the manure. He said the air got so foul that he attributed the death of the chicks to the smell of the manure. He proved also, when he set a hen on the manure pile, that her eggs hatched all right. In that case the hen was not covered over with manure where the cask was.

He had lined these casks on the inside with various things, plaster paris and other kinds of plaster, tar and various things, that was supposed to keep the fumes from coming through. He finally decided the fumes were so bad in there that it was killing the chicks and then he built a different kind.

Q. Then he suggested putting a fan in to take the fumes off; do you find in there that he actually said he did use a fan or he might use a fan, I wish you would look and see?

A. He said on page 185——

Q. Yes.

A. He says that——

Q. He says that "one which I have not as yet made use of, but which cannot but be good, is to have the air renewed by means of any ventilator whatsoever; you might make a pretty good one of a fan many feet long, and as wide as the height of the ceiling would allow. There are a thousand ways of disposing such a fan so that one might make it move quickly enough; it may be made of thin boards or with pasteboard; and it will sweep away that air that has stagnated too long in the place, and will [fol. 466] force new air into the place of it." That is correct?

A. That is correct.

Q. He apparently never did use a fan which he thought he might use, is that correct?

A. That is true in that paragraph. In the next paragraph:——

Q. In the next paragraph he speaks about using a pipe which he might put in the cask or which he did put in the cask and then when the air got too bad inside the cask he would blow the air out and blow fresh air in?

A. That is right.

His idea was to get away from the vapors and odors given off by the manure. The air was blown through to get rid of the excess moisture.

Turn to page 154 in this book, about the middle of the page:

"The first brood was much more considerable than those which came after, it consisted of about sixty eggs which had been collected beforehand; this is not mentioned on my journal which I had not as yet begun. But notwithstanding all I had hoped from it, on account of my having always found the eggs in the proper degree of warmth, and to appearance perfectly dry, I had nevertheless but three or four chickens from the whole number."

"I attributed this bad success to some remainder of moisture in the plaster of the oven."

Turning to page 62 of the book, it says:

"But the accident I experienced from the excess or from [fol. 467] the want of a proper degree of heat, were not what stopped my progress in these attempts; I even attributed some to these two causes that proceeded from one another and that in the very first brood. The eggs of this, and those of a great many other broods, began at the eighth or tenth day to fail my expectations. I had till that time found the chickens as much forward as I could wish, in the eggs I had broken; the scene began to change afterwards, and the bad smell that this diffused itself all over the oven, informed me that some of the eggs at least had contracted an infection there. These were easily distinguished from the rest; for, the matter that gave them that fetid smell, by being rarified, had burst the shells of several of them, and run out; and the same matter, without breaking the shell of others, had made its way out of them through the natural pores of the shell which it had only widened. These rotten eggs were all carefully taken out of the oven the next day, but it was full of stench, no less offensive than that of the day before, and I then found again as many broken or rotten eggs to be taken out as there had been at the last examination. Every day continuing thus to supply me with more rotten eggs, I was compelled to conclude from it, that some fatal accident had happened to them all, and that I did myself no injury in breaking the remainder of them, though they had not as yet given any tokens of corruption. All the eggs [fol. 468] which ought by this time to have contained forward chickens, diffused a most offensive smell as soon as the shells were opened; the chickens in them were dissolved and reduced to a kind of black liquid paste in some and to a greenish one in others; they were, however, entire and pretty large in some of them, and already covered with feathers in a few others.

"I should have been tired too soon if I had been disgusted by the bad success of my first brood. It seemed even to promise better, since I was advanced so far in it as to cause chickens to be unfolded and to grow for fourteen days together, as well as they would have grown and been formed if the eggs had been kept all that time under a hen. Since these eggs had in fact been properly warmed during two-thirds of the time they ought to have been so,

there appeared sufficient hope, that by redoubling my attention I might afterwards arrive at a method of warming them with equal success during the remaining third of the time they were to have been in the oven."

Turning over to page 157, it says:

"But why, some will ask, does the moisture, which did not hinder the germ from unfolding itself and from growing, and which had not hindered the chicken from being formed, yet make it die afterwards, sometimes sooner and sometimes later? and why is it more commonly fatal to [fol. 469] it, when it has almost attained its full growth, than at any other time? Can a mere watery dampness be capable of producing such dismal effects? Does not the moisture which kills the chicken, poison it with the sulphurs and volatile salts it is impregnated with, and which have exhaled from the dung? Why, in short, are there chickens that resist this vapour, and are hatched at last whilst a much greater number of them are destroyed in their shells, although the eggs of them all have been warmed in the same basket, and one as much like the other as possible?"

I would not like to operate under the system described here in this publication in our incubators out in Wisconsin. I have always thought I would like to try making one of these and see what success we would have. We do not operate under any such scheme as is described. Modern engineering has given us an easier way of doing things.

Q. Exactly so. Now, Professor, have you ever experimented at your place, your place is the Wisconsin University?

A. Wisconsin University.

We have never experimented in the Wisconsin University to determine whether or not this B. W. D. is spread in so-called still air incubators. We have simply followed what this man in Kansas discussed. We have not made any independent investigation of our own.

The Court: Have you not ever made any investigation into the cause of this disease in your poultry department? [fol. 470] The Witness: Yes, your Honor, we have carried out pullorum disease studies, but nothing to do with incu-

bator spread. Our project has been Cornell project 307, and was discontinued about a year ago. We spent about six or seven years on this disease, but there was no incubator spread studies made in our project.

Q. You know, however, considerable study has been made by the Agricultural College at the Experimental Station in Maryland to determine the spread in the incubators?

A. Dr. Bunyea?

Q. Yes. You also know that has been compared with the spread of B. W. D. in products, too, when comparative tests have been made?

A. I heard Dr. Bunyea lecture two or three years ago on some of that work, but I have not seen any recent reports of it.

GLEN F. RICHARDS, a witness for the defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

I am manager of the Poultry Division of the Northwest Branch of the James Manufacturing Company, located at Minneapolis, Minnesota. In the course of my work I have contact with the customers of the James Company in a practical manner. Part of my duties are to make contacts with the customers in connection with sales and service and the direction thereof.

As to my experience and education in connection with [fol. 471] poultry matters, after finishing high school in 1908, I took a four-year course of college work at Palmer College and Iowa State Agricultural College, and I am a licensed poultry judge, and have judged a great number of shows in the Middle West. I have had no special education in connection with Embryology of Chicks other than that which comes in the regular science course.

I specialized in agriculture, and poultry husbandry.

Whether, in the light of my educational experience and my personal experience in the trade, there is any difference between the first, the first to seventeenth day and the last three or three and one-half days in the incubation and hatching of a chick—the terms "incubation of hens' eggs"

and "hatching of hens' eggs" have been rather loosely used in a synonymous way and as applied by the public and poultry people by and large, meaning simply the process of bringing a fertile hen's egg to complete development from which a chick would emerge, but there is a distinction as to the period of development of growth and so forth of the germ, from the time it is placed either under the hen or in an incubator until a complete chick is developed therefrom and emerges from the shell. As Professor Hutt brought out, there are four stages, which is quite correct, but there are two, each of them making up the two common stages, commonly known in the process, that of incubation, which might be said to cover from the first to seventeen and one-half or eighteen days or thereabouts, and the second general stage, from then until the chick has emerged from the shell and it is a complete ani- [fol. 472] mal, to meet the world as any complete animal does, fully formed. This last period properly is called hatching and the preceding period is properly called or termed "incubation".

As to having technical authority for that distinction on which to base my statements, I refer to the work of Dr. Frank Lilly, head of the Department of Embryology of Chicago University whose text I have here. This is a standard work in all schools teaching Embryology. It so happens that the development and growth of the baby chick is studied as foundation material for studies going in various and practically all of the phases of Embryology and as foundation material thereto.

I am referring now to the text "The Development of the Chick" by Lilly, published in 1908. I have photostats of the pages I am going to refer to. They are these assembled in a set.

I refer to part two, where the Embryonic Membranes have started to appear or form and the illustration thereof, toward the bottom of page 211. You will see the embryo of the chick at three days and sixteen hours of incubation, as per the experiments of Dr. Lilly. Then passing on to pages 218 and 219, I should have said, showing still further stage.

At page 219, and the description of 218, the figure 127 represents the fourth day of incubation. Figure 128 represents the ninth day of incubation. At page 220 you will

see the stage which represents the period or the point of development where the chick is no longer an endothermic unit but rather an exothermic, or the time when more heat is being given off than is being absorbed by the growing [fol. 473] organism. That is the twelfth day.

As to the distinction between hatching and incubation, at page 232, beginning at the top of the page, is a summary of the various stages and he proceeds at the beginning, at the top of the page as follows:

"About the 14th day the growing embryo accommodates itself to the form of the egg so as to lie parallel to the long axis with its head usually towards the broad end near to the air-chamber. Sometimes, however, the embryo is turned in the reverse position. The head is bent towards the breast, and is usually tucked under the right wing."

The next sentence is where I am going to call the attention of the Court to the distinction between "hatching" and "incubation".

"Important changes preparatory to hatching take place on the seventeenth to the nineteenth days. The fluid decreases in the amnion. The neck acquires a double bend so that the head is turned forward, and, in consequence, the beak is toward that part of the membranes next to the air-chamber. The intestine is retracted completely into the body-cavity, and on the 19th day the yolk-sac begins to enter the body-cavity. On the twentieth day, the yolk-sac is completely included, and practically all the amniotic fluid has disappeared. The chick now occupies practically all [fol. 474] the space within the egg, outside of the air-chamber. The umbilious is closing over. The ductus arteriosi begin to contract, so that more blood flows through the lungs."

You will note there he states "More blood flows through the lungs", indicating the process is not yet complete, where the chick is a complete lung breather, which is impossible until the chick's lungs are completely filled with blood.

"The external wall of the allantois fused with the chorion still remains very vascular. Now, if the chick raises its head, the beak readily pierces the membranes and enters the air-chamber."

At that point or very near that point, is where the chick becomes a breathing animal. That occurs in the last three days of the transaction, toward the latter part of the last three days.

"It then begins to breath slowly the contained air; the chick may be heard, in some cases, to peep within the shell two days before hatching, a sure sign that breathing has begun."

That is quite evident that peeping represents essentially the necessity of air, and then, of course, the chick would have to have been an air breather before peeping could have taken place, showing a sign that breathing has begun.

"But the circulation in the allantois is still maintained and it still preserves its respiratory function. When the [fol. 475] chick makes the first small opening in the shell, which usually takes place on the twentieth day, it begins to breath normally, and then the allantois begins to dry up and the circulation in it rapidly ceases. It then becomes separated from the umbilious, and the remainder of the act of hatching is completed, usually on the twenty-first day."

That is the conclusion of the book.

As to the external conditions that have to be taken into account in accommodating the artificial incubation period from the first to the seventeen and one-half days, the final three or three and one-half days, inasmuch as the process is different, the requirements or environment, that is the best environment for it would naturally follow to be somewhat different, particularly with reference to humidity and temperature.

With respect to the differences as to temperature control that you must have for the last three or three and one-half days, as compared to the first seventeen days, based on my experience in the field, a slightly higher temperature is preferable, likewise somewhat of an increase in humidity.

In our James machine we carry a temperature that ranges from 102 to 104 in the hatcher as distinguished from about 100 or 100½ in the incubator. Our users are directed to maintain and operate with temperatures of 102 and 104 in the hatching compartment, gravity ventilated compartment, and with a temperature of 100 and one-half in the

incubating compartment. I find those instructions followed in the field.

[fol. 476] As to the wet bulb temperature, I might call your attention that our operating instructions have to be of necessity somewhat general to cover all sections of the country. We ship incubators to all parts of the United States, and there are certain climatic conditions that have a slight influence, but humidity running from eighty-two to eighty-five is the common practice.

In our hatcher is provided a moisture pan that covers the entire floor of the compartment and directions or reasons are given that this pan be filled and kept filled with moisture at all periods of hatching.

In our incubator the moisture is also supplied by open pans with adjustable or movable covers on them and the air passes over these pans, being agitated by the impeller, and picks up its load of moisture as it passes down the back and rear, that is, the portion of it that passes down the back and front channels into the egg chamber.

In the James Way incubator the moisture is regulated by the amount of evaporating surface area and you control it by the adjustment of the covers, moving them to the front or rear, increasing or decreasing the amount of surface opening.

We adjust the amount of moisture by sliding the covers or tops of the water pans to the amount needed. That is the practice of our customers in the field.

We do not make any effort to conserve the amount of moisture used in our machine other than by adjusting the top of the water pans with the number of eggs in the cabinet. In size our pans are equipped for any amount of [fol. 477] moisture needed and water, being plentiful and cheap, no attempt is made to cut down on the use of it within a reasonable degree. Excess of moisture as distinguished from an under amount of moisture for a reasonable amount of time, will not injure incubating eggs. An excess is not as injurious as a deficiency thereof, that is, humidity within the egg chamber.

If water is once taken out of an egg it is impossible to replace it.

As to the practice by our customers as I have observed and as is recommended by the James Company, respecting the regulation of the amount of moisture there shall be in

the egg, the best condition is the exact amount it needs for a given time, but we do caution the customer for two extremes, it is better to under-evaporate than over-evaporate. This means it is better to have too much than too little moisture.

Regarding controlling the moisture by the slides, in the front of the incubating cabinets are four exhaust openings or ports and these are used to adjust or control the air purety or the amount of air that passes through the compartment, largely depending upon the amount of eggs or the amount of air or free oxygen needed for the eggs in the cabinet at a given time. If there is less than a full load in the incubating cabinet, it is customary to have these openings considerably closed. As the number of eggs increases, as they go into the cabinet, the amount of these openings is likewise increased in the adjustment thereto.

If you have a dry climate like Colorado, in an emergency of that character, we suggest that a certain amount, that is, of course, it depends, we open it up as much as possible [fol. 478] and these slides in such cases may be pretty well closed but never entirely closed, always providing for the admission and emission of a certain amount of fresh air.

On the subject of the authority for stating that there are two stages, one of incubation and one of hatching, I have one other book here by Professor Balfour, of Cambridge, England, published in 1881, entitled, "A Treatise on Comparative Embryology". From my examination, this publication, in my view, comes to the same testimony I have already given in connection with the Lillie book. It is very much the same as Dr. Lillie, though not quite so extensive. He covers the general field of Embryology.

(Counsel for defendants then offered in evidence the photostats of the first book, "The Development of the Chick", particularly pages 211, 218, 219, 220, 221 and 232, and the illustration opposite to it, and the cover page as well, and they were admitted as Defendants' Exhibit No. 70.)

(Defendants' Counsel then offered the title page and pages 164, 165, of the "A Treatise on Comparative Embryology by Dr. Balfour" and they were admitted as Defendants' Exhibit No. 71.)

Regarding my understanding, by observation, of the function of the so-called turbulator at the bottom of the

egg chamber or cabinet of the James incubator, it is for the purpose of mixing, stirring or churning the incoming fresh air or oxygen supply with the streams of air that come down the front and rear channels.

[fol. 479] As to having had any practical experience in the field with the operation or failure to operate of this turbulator in the James incubator and the results of incubation and ultimate hatching, I might call to your attention, during the first year incubators were in the field, which would be the hatching season of 1930, these agitators which are driven by a belt that comes from the main shaft down through the center of the machine, and in the first year that belt was made of a coil spring similar to the coil spring on a screen door, only at each end fastened, and that belt gave us some difficulty in some instances that year by way of breakage, some seeming to have been a little too hard, and it would snap, and others not tempered hard enough, and it would stretch, and in either case the agitator would not function properly or cease altogether, and in installations where the installation consisted of two or more units or cabinets, and where one of these would break and the non-operation of it not be observed by the operator for some period of time, we will say, two or three days, a lesser hatch of some five to ten per cent. would result therefrom.

In hatchery practice of the present day, that is of 1930, and since then, the effect on the hatchery profits, the loss of five to ten per cent. of the ultimate hatch is a very important matter in the commercial operation of a hatchery, inasmuch as a difference of five per cent. on an average sized hatchery, or any hatchery, for that matter, could mean the difference between financial success and failure for the operator.

I have heard here in this testimony, a discussion about BWD, I understand what that is; at least, I understand [fol. 480] something of it. I have had experience with that disease. I have had the personal experience in a normal way and have observed bacillary white diarrhea bring about disastrous effects to quite a number of poultrymen.

As to the method of distribution of this disease, as far as artificial incubators are concerned, a common authority for this, by way of research work, is a bulletin that was prepared by the experimental station at the Kansas State

Agricultural College, Manhattan, Kansas. I have read that bulletin.

The statement in that bulletin that the disease is carried by the so-called forced draft movement of air in the incubator where eggs are hatched is borne out by my own observation in the field, in connection with the statements of hatchery operators or purchasers of baby chicks.

This question of disease has very evidently received official cognizance in connection with baby chick hatchery men of this country recently, as it is shown by the recent hatchery code for the operation of hatcheries, both commercial and breeders, and this Code was approved by President Roosevelt on December 29th, 1933. I cannot answer definitely whether the hatchery men are operating under this code today out in the field, because I have been here at this trial pretty much all of the time since and hatcheries by and large, I do not think, are in operation, particularly in the section of the country where I come from.

[fol. 481] There is a chapter in this code devoted to this pullorum disease, or what is known as bacillary white diarrhea. You will find that beginning with Article 9, I believe, and continuing down through most portions of that page and then there is a further supplement to this code issued January 16th. The supplement was issued by, I believe, the Co-ordinator, under the Code of The International Baby Chick Association which is the supervising agent of the Commercial & Breeders Hatchery Code and with particular reference to Paragraph 21. I have no copy of that code. I will have to have photostats made.

(Defendants' Counsel then offered in evidence as a single exhibit, the copy of the official code and supplement bulletin from the International Chick Association and it was admitted as Defendants' Exhibit No. 72-A.)

(Defendants' Counsel then offered in evidence the Supplementary Bulletin to the Hatcherymen's Code, from the International Chick Association and it was admitted as Defendants' Exhibit No. 72.)

Mr. Toulmin, Jr.: You may have the witness, Mr. Ely, I am through with the direct examination.

Mr. Ely: What part of this code were you referring to?

Mr. Toulmin, Jr.: We were referring to starting at Ex-

hibit "A", and running on down and particularly to Paragraphs 10, 11, 12, 13, 14 and 15 and in Exhibit 72-B particularly Paragraph 21 of that bulletin.

[fol. 482] The Witness: I might have given that page number but I could not see it very clearly here.

Cross-examination.

By Mr. Ely:

Q. I do not find anything in these marked paragraphs of this code concerning forced draft and still air incubators or anything of that kind in that code, Mr. Richards?

A. It was not my intent to indicate that referred to incubators, Mr. Ely.

Q. This code has nothing to do with the operation of incubators, has it, this code?

A. It is hatching practice, the code is applicable to hatching practice.

Q. But I do not see anything there that says that must be hatched in any separate hatcher. Do you find anything of that kind there, in order that they may be advertised as blood tested?

A. You might, if you wish, Mr. Ely, read these few short paragraphs through.

Q. Go ahead and read what you find in there.

The Court: What do you claim for this Code?

Mr. Toulmin, Jr.: We claim that it is recognition of the fact that this disease is a vital question in hatchery operation, and then when you read that Code in connection with the supplement, paragraph 21 on 72-B, which reads as follows:

"When chicks are advertised from blood-tested parentage, they cannot be hatched in the same incubator or same incubators as are flocks not blood-tested."

[fol. 483] The purpose being to show you have to segregate this disease and this Code shows that is national recognition of that fact.

The Court: Does that mean in hatching?

Mr. Toulmin, Jr.: Yes, it does not make any difference, the birds as well as the method of hatching, you have to

have the separation. It shows the transmissibility of this disease.

Mr. Ely: Nobody disputes that. As a matter of fact, this supplement to the Code does not say anything about forced draft machines and that chicks cannot be hatched in forced draft machines.

The Witness: It has reference, Mr. Ely, purely to hatchery practice.

Q. That is to say, you must not hatch infected chicks in the same incubator?

A. Yes, sir.

Q. And that is true whether you use a forced draft machine or a still air machine, that portion of the Code covers both, does it not?

A. That, I take it, to be an acknowledgment that the disease is transmissible within the incubator.

You would violate the provisions of this Code just as well if you hatched infected chicks and non-infected chicks together in a still air incubator. It is not my purpose or province to interpret this Code.

Q. That Code means, and, you could violate the provisions of this Code by hatching infected and non-infected chicks in a James incubator?

A. I presume non-infected chicks could become infected under a setting hen.

Q. The purpose of this question is, you could violate this [fol. 484] Code just as much if you had infected and non-infected chicks in a James hatcher?

A. I take it this disease can be transmitted in an incubator.

Q. Would you not violate this Code just as readily or just as much, if you hatched infected and non-infected chicks in a James Way incubator, would you not then violate the Code?

A. It is quite impossible to hatch chicks in a James Way incubator.

Q. A James Way hatcher, then?

A. A James Way incubator, would, according to the Code, have to be in a separate room from where the hatcher was, in another room.

Q. Let us assume we have a James Way hatcher, we are not talking about incubators, but a James Way hatcher,

you set eggs in there, some are infected and some are non-infected, you would then be violating the provisions of Paragraph 21 of the Code?

A. If they were in the same room.

Q. If they were in the same hatcher, I mean?

A. The same hatcher in the same room.

Q. No, now. Wait a minute, please. Answer my question. Now, just concentrate on the James Way hatcher, one James Way hatcher, and I set eggs from an infected and non-infected flock in that hatcher, am I not violating the provisions of Paragraph 21 of the Code?

A. Well, I would like to answer that, Mr. Ely, by saying we don't set eggs in the hatcher, they are transferred to the hatcher at the close of the period of incubation.

Q. Do not fuss with me in the matter of words.

A. If you mean a sectional type incubator, I can answer your question.

[fol. 485] Q. Iam talking about the hatcher, that section on top of the incubator. 180 eggs go in that hatcher?

A. 210.

If we set 90 eggs from an infected flock and 90 eggs from a non-infected flock in that hatcher, we would violate the provisions of the Code, but in James Way practice we do not set eggs in the hatcher. If we put eggs to be hatched together, eggs from an infected and non-infected flock, in the James Way hatcher, I think we would be violating the provisions of that Code.

Even if you did that in the same room, I take it you would be violating the provisions of the Code. This BWD can be transmitted through the air in the room and it has been so held. I think it has not been held by anyone in authority that this BWD is communicable through the pores of an eggshell.

It is simply transferred from chick to chick after emerging from the shell. The presence of eggs in the first eighteen days, is not detrimental to the transfer of BWD. The chicks in the shell will not get the disease until they have reached the seventeenth or eighteenth day, or hatching stage; not until they are out of the shell or start to emerge; not until the shell is broken.

This mythical line between hatching and incubation that takes place, by most authorities, is recognized somewhere

between the 17th and 19th day. That will vary, depending on the breed of chickens, the subject of the incubation process, and so forth, just as to the exact period or hour.

Q. Now, you noticed this language says, "important changes preparatory to hatching takes place on the 17th to the 19th day".

A. Which language?

[fol. 486] (Mr. Ely shows page 232 of Defendants' Exhibit No. 70 to the witness.)

Q. You notice that, do you not? That is, what takes place on the 17th to the 19th day is preparatory to hatching and not hatching?

A. Preparatory to the hatching which takes place on the 17th to the 19th.

Q. Wait a minute.

A. As I read that——

Q. The important changes preparatory to hatching takes place from the 17th to the 19th day?

A. These changes take place, changes, Mr. Ely, are constantly taking place at every hour in incubation as well as hatching.

Q. Those changes referred to there from the 17th to the 19th day are preparatory to hatching, that is what it says?

A. I take it so.

Q. That is not hatching?

A. Everything which takes place during the first 17 days would be likewise preparatory to hatching.

Q. As far as hatching is concerned, they are all changes preparatory to hatching, these developments of the chickens are all changes preparatory to hatching, and then according to your interpretation of this document here, where does that mythical line, that place, where is it found?

A. The best answer would be at the time the chick begins to use its lungs breathing or partial breathing.

Whether that is on the 17th day depends on the rate incubation has taken place and also the breed of chickens from which the particular eggs would be from. The chick begins to peep sometimes as much as two days before it emerges from the shell.

That would probably be about the 19th day in some cases, [fol. 487] and some sooner. Some hatches will be completed before 21 days.

Q. It will be about 48 days before they actually come out of the shell?

A. You mean 48 hours.

Q. 48 hours before they actually come out of the shell?

A. 48 to 60.

Q. You notice, it says the chick may be heard in some cases to peep within the shell two days before hatching?

A. That would be 48 hours.

Q. According to this, the hatching would not occur until the 21st day?

A. The hatching is the process that each of these authors quite defines as that taking place approximately the last two and one-half days of the 21 days period.

Q. Now, wait a minute, you said that the chick started to peep about the 19th day. I notice this author says it starts to peep two days before hatching, so he must refer to hatching as the actual emergence of the chick from the shell, look at that?

A. If the peeping was taking place just before the chick emerged, but it could peep, and probably—I have heard it in my own experience two days before it emerged from the shell and it was a lung breather according to experience before it could peep.

I would not take the hatching according to this author, as the actual emergence from the shell.

Q. Notwithstanding that it says the chick begins to peep two days before hatching, and you testify the chick begins to peep on the 19th day?

A. As an average or general thing, about the 19th day.

The purpose of having those openings in the James Way incubators is to control the amount of air that passes through [fol. 488] the chamber; that is, to control the amount of air that passes out of the chamber, which, in turn, would effect the amount of incoming air. The air which goes out of the chamber necessarily carries moisture with it.

Q. And therefore if you cut down the amount of air which passes through the chamber you will save some of the moisture?

A. That will be obvious, Mr. Ely.

Q. Perfectly obvious, you can conserve moisture by

throttling the amount of air which passes through the chamber?

A. For an emergency.

Q. I am not talking about emergency, I am talking about the general purpose. You can throttle the air by regulating the amount of the opening?

A. That would be the result.

Q. And by reducing the amount of air which passes through the incubator to reduce the loss of moisture?

A. Yes.

Q. It is clear that if I open the air wide open and blew the air through I would blow all the moisture out of the incubator?

A. Depending on the length of time it was open.

Q. If I opened it and blew all the air out I would blow all the moisture out in a short time.

A. Depending upon the flow.

Q. Then by reducing the exit of the air, I reduce the amount of moisture lost inside the incubator, is not that so?

A. It has that effect, but by referring to the instructions you will note that the operator is cautioned never under any circumstances of emergency, even, to close those slides or openings entirely.

Q. That is because you have to have the same amount of [fol. 489] fresh air going through the machine too?

A. Fresh air is essential.

Q. And you have to have balance the requirements of fresh air for your chicks against the disadvantage or loss of moisture because you have too much air going through?

A. The use of those slides is not to balance air against moisture, it is to balance air against egg content of the chamber, the air supply.

Q. Nevertheless, that is what happens.

A. A certain effect to that effect would occur.

Q. You cannot get away from it, can you?

A. No, sir.——

Q. That is to say, ventilation should also be controlled to quite some extent by the humidity of the cabinet, is not that so?

A. No, sir, it is controlled materially, by the amount of openings in the James Way moisture pans.

Q. The ventilation, let me read you this "The ventilation should also be controlled to some extent by the humidity

of the cabinet as described in the last passage". Read that passage and explain what you mean by that? That is from the James Way Incubator Instruction Book.

A. Will you point that out again, please?

Q. It reads as follows "Ventilation should also be controlled to some extent by the humidity of the cabinet as described on the last page".

A. Yes.

Q. That means, does it not——

A. Then as——

Mr. Toulmin: Let him finish his answer.

Q. That means, does it not, that the ventilation and humidity have relationship?

[fol. 490] Mr. Toulmin: I submit the witness should be permitted to answer the question. He said he wanted to call attention to the next page.

The Court: His answer was directed to the particular language of the catalog, that was all.

Mr. Toulmin, Jr.: He wanted to make it clear by referring to the next page.

Mr. Ely: Do not worry, Mr. Toulmin, I will straighten that out.

Q. Does that not mean there is an essential relationship between humidity of the cabinet and ventilation?

A. Not for the purpose of ventilation, the opening and closing of these slides, Mr. Ely, I would say would have an effect on the humidity control but it is not the purpose. They are not, as far as design and usage are concerned, humidity controls.

Q. Whether it is your purpose or not, it is the natural result that flows therefrom.

A. It is an engineering fact.

Q. Let us go over to the next page, you want to talk about that. Will you read this sentence "If you are unable to bring the humidity up to the correct wet bulb temperature", explain what that means?

A. There is this paragraph "Humidity can be increased in the cabinet, not only by opening the moisture pan cover but also by partly closing the ventilation slide".

Q. Yes.

A. But note "by partially closing", the caution is throughout the catalog or instruction book.

Q. You could not close it entirely because you would smother your chicks.

[fol. 491] A. Not essentially, it is a safety factor incorporated so that if you are unable to bring the humidity up to the correct wet bulb temperature, by opening the moisture pan cover, you may partially close the slide, but do not close them entirely, even though you have but a few trays in the cabinet, in other words, the caution exists the second time, and that would be under emergency circumstances.

The purpose of having the interior of the cabinet humid, and keeping it moist and humid is to prevent too rapid an evaporation of the water content of the egg. That is so in any incubator. The more humid the interior of the cabinet is, the less rapid will be the evaporation of the moisture in the egg or the water in the egg.

That is why we keep an incubator humid, keep the interior atmosphere of the incubator moist. The purpose of the illustration on Page 117 of the James catalog, book No. 79, showing a faucet dripping water into a pail from an egg, is to indicate that the rate of evaporation of moisture content of an egg within a James Way incubator is controllable. That is controllable by the humidity within the chamber as one of the factors, which in turn is controllable by slides on the moisture pans.

Q. Also which in turn is controlled by the extent to which the slides are open?

A. That could not occur if the incubator is full of eggs.

That moisture content is also affected by the amount of air passing through the machine. It would be so even if the cabinet is full of eggs.

Q. Yes, and if it would be affected if it is full of eggs——

A. They would be fully open, if it is full of eggs.

They control the amount of air passing through the ma-

[fol. 492] chine, and have an effect on the moisture.

They do not control the amount of moisture lost by air going out of the machine, not entirely so, only slightly.

Q. They do control it, do they not? I am talking about moisture lost by the passage of air through the machine. You stated a while ago if we opened it up and blew all the air out we would lose our moisture and by restricting it, by having small openings, you conserve the moisture, do you not, in the James Way?

A. It would be conserved if the machine is full of eggs.

Q. It would be, I mean whether the machine was full of eggs or whether it was not full of eggs, the moisture would be conserved just the same by the restriction of air passing through the machine, is that not so?

A. The effect would exist.

Q. How many openings would you say were opened on the machine in the normal operation, when it was full of eggs?

A. From two to four, that I can——

Q. From two to four. You have a control of the amount of air which is passing through the machine by having four outlets, one, two, three or four, all of which can be opened at the discretion of the operator, is that so?

A. There are four openings at this point, yes, sir.

The outlets can be opened, one opened, two opened or three or four, in the discretion of the operator. This passage from our instruction book: "When the cabinet is full of eggs, both the extreme right and left openings should be uncovered", means two openings, and we have two more to go on if we have to.

[fol. 493] If the air outside is very wet, moist and humid, you can open up all four, but that would depend to quite some extent on the room temperature, because the greater the amount of opening with a high room temperature in relation to a smaller opening, the greater amount of moisture would follow through.

In our instruction book it is stated that normally when a cabinet is full of eggs you have only two openings. There are instructions in supplements which do not seem to be there, whereby also the entire four openings are directed to be open at certain times.

BENJAMIN F. ZAPPKE, a witness on behalf of the defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

My residence is Fort Atkinson, Wisconsin. I have charge of sales and service of the Poultry Division of the Fort Atkinson Branch of the James Manufacturing Company.

That includes the incubator-hatcher, the subject of the present controversy. I have had experience out in the field with the operation of the incubator-hatcher of the James Company which we are now discussing. I have had experience with the turbulator or air mixer in the bottom of the incubator portion of the machine.

As to the operation of that apparatus, the first year we [fol. 494] had a steel coil spring for a belt and we had a certain amount of complaint on the breakage of that belt, which was changed the next year. I know of some cases where the belt would break in one cabinet and not in the other, and the operator would not notice it was broken for probably a period of two or three days, and the results from part of the trays would be left in that cabinet where the belt was broken and those that were not broken, and in two particular cases, it so happened that eggs came from the same flock and were put in different cabinets so we had a pretty close check on actual hatching results in that manner.

In one case it ran over all the eggs set, it ran something like five per cent and in the other case something like seven per cent difference.

Under present commercial operation of hatcheries, present competitive conditions, the effect on a hatchery profit of a difference of five to seven per cent in the number of chicks hatched, would represent the differences very often, especially in recent years when chicks are selling on such a narrow margin, between profit and loss for a hatching season.

Mr. Toulmin, Jr.: That is all.

Cross-examination.

By Mr. Ely:

We noticed a falling off in the hatching, when this belt to the turbulator broke in one case, in the third and fourth trays from the bottom, and in the other case it was the bottom two.

Mr. Ely: That is all.

[fol. 495] JOHN GEORGE SHODRON, a witness on behalf of the defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

I am consulting engineer and researchist for The James Manufacturing Company, Fort Atkinson, Wisconsin. I have been connected with that company between twenty and twenty-one years. I have done work for the James Company in connection with the incubator-hatcher now the subject of the present controversy.

I have had occasion to observe the operation of the incubator portion of the incubator-hatcher. My observation, with particular reference to the so-called turbulator or air mixer at the bottom of the egg cabinet and the operation of such instrumentality, has been that the turbulator or air mixer takes the down coming air and the cold intake air and thoroughly mixes them and breaks it up into a homogeneous mass.

The reason for so doing is to get a homogeneous mixture of a uniform temperature and to break up any existing currents.

I was present at a demonstration in the store room near by here, in the introduction of smoke into the bottom of the egg chamber of the incubator of James. The small smoke apparatus was set into action and its outlet nozzle was placed directly under one of the four intake openings at the bottom of the egg chamber, the right-hand egg chamber, and the smoke was left free to enter the chamber. It rose, and fountain-like, spread out and mushroomed over the floor of the egg chamber, on the inside of the egg chamber. [fol. 496] The air mixture motor was then started and immediately upon the action of the air mixer, the entire mass of the smoke was thoroughly mixed so that it was a blended mixture entering the lower section of the chamber.

I have had occasion to make actual tests with the James incubator and later to hatch the eggs in the hatcher, taken from the incubator, under conditions, where first the turbulator was run and under other conditions where the turbulator or air mixer in the bottom was not run. I did not do the work actually myself but it was under my inspection. I controlled the work. I did not do the manual labor. I

am in a position, by reason of my supervision of this test, to certify to the Court that my next statements as to the result of the tests are correct.

I do not recall just which of these tests were conducted first. I think without the air mixer in operation, but the incubator was run with the turbulator in operation and the results were noted and in record form, also in picture form. Again the same test was conducted without the turbulator running and making a comparative study of the actual figures and pictures.

Starting with the top sheet and going down, the first is a report of a hatch of September 16, 1933, a tray 6-C, which was the identification mark on the front of the tray. It was set on August 25th at 10:30 A. M. The chicks were taken off September 16th at 10:40 A. M. The position in the cabinet was the fourth tray from the top. The turbulator was running. The number of eggs set was 196. The number of infertile eggs was 26. The dead germs and chicks that [fol. 497] failed to get out was 24 and the chicks hatched was 146, out of a total of 196 eggs set, a percentage of hatch of fertile eggs was 85.88 per cent.

The next was a report of a hatch on September 16, 1930, tray D-6, also identified on the front of the tray No. B 62, B 63, set August 25th at 10:30 A. M. and chicks taken off at September 16th at 10:00 A. M.; position in the cabinet fourth tray from the top, turbulator out. It was not running; was removed from the chamber. The number of eggs in tray, 196; number of infertile eggs, 33; number of dead germs and chicks that failed to get out, 28; number of chicks hatched, 135 out of 196 eggs set, percentage of hatch of fertile eggs was 82.82 per cent.

The next is a report of a hatch of September 16, 1930, tray No. E 2, identified by a photograph showing tray No. E 2-2, E 2-3, set August 25th at 10:30 A. M., and chicks taken off September 16th at 11:00 A. M.; position in cabinet eighth tray from the top, turbulator running; number of eggs in tray 196; number of infertile eggs 44; number of dead germs and chicks that failed to get out 18; number of chicks hatched 134 out of 196 eggs set, percentage hatched of fertile eggs 88.15.

The next is a report of a hatch of September 16, 1930, tray No. D 6, identified by a photograph showing tray No. D 6, D 6-2, D 6-3, set August 25th at 10:30 A. M.; chicks

taken off September 16th at 10:20 A. M.; position in cabinet, eighth tray from top; turbulator out; number of eggs in tray 196; number of infertile eggs 27; number of dead germs and chicks that failed to get out 29; number of chicks [fol. 498] hatched 140 out of 196 eggs set, percentage hatch of fertile eggs 82.84 per cent.

In photographs attached to my report, at the bottom of each tray are certain letters and numerals. Those are the letters and numerals to which I refer in these reports. On the back of each photograph there is a repetition of this same data.

As to the effect of the turbulator or air mixer, when it is running and not running in the bottom of the incubator cabinet, so far as ultimate result of the hatch is concerned from the hatcher, this series of tests shows that the efficiency is increased in incubation and that the increase of this efficiency is sufficient to make either failure or success of the machine.

Counsel for defendants then offered in evidence the Shodron report with attached photographs and the same was admitted as Defendants' Exhibit No. 73.

With reference to why the Goldstein machine made in accordance with the Goldstein Patent, which is over in the demonstration room has two openings with slides on the door of the machine, in the rear door of the Goldstein machine, they were placed there for the purpose of checking the temperature, both dry and wet bulb temperatures.

These openings were not used during the hatching procedure outside of making test readings from time to time by the operator and myself. We would just open the slide, stick the thermometer in, take the reading for perhaps a minute or a minute and a half and take the thermometer out and replace the slide.

[fol. 499] Cross-examination.

By Mr. Ely:

Q. Do you have any other opportunity of ventilating the Goldstein machine except these openings, Mr. Shodron?

A. I did not.

Q. Mr. Shodron, how many trays of eggs were there in this incubator, how many trays, was this your ten-tray machine or twelve-tray machine?

A. The regular ten-tray machine.

Q. Now, I notice that the variation in hatching here goes from 85 to 82 per cent. and 88 to 82 per cent. And 82 per cent. hatch is a pretty good hatch in anybody's incubator, is it not?

A. I would say so.

Q. And you might have just as much variation in percentage of hatch in different flocks and different eggs, might you not, as you have got here, possibly get as great a variation as that in the normal operation of the machine?

A. If it were observed flock against flock.

Q. Your answer is, "Yes", then?

A. Yes, if you were——

Q. It is possible to get a variation?

A. It is possible, if you are observing flock against flock. It is possible to get as great a variation in the operation of any normal incubator as found here in our various tests, if you were making no preparation to get uniform distribution of eggs. Such a variation is possible in 196 egg operations between various hatches if you are not taking any precautions against that particular point. That is correct, subject to the variations in the quality of the eggs. You are subject to that variation if you do not make provision to avoid that variation.

Q. That is, you cannot go into each egg before you set it [fol. 500] and tell whether it is going to be a good hatch or not?

A. No, but I can tell my eggs, if I have 196 to set in one tray and I take a tray, say of 400 eggs, and take one egg and place it in that tray and an egg and place it in another tray and so on, and in that way get a thorough mix of the samples taken.

We do not make any more tests than these four tests recorded here. These are all the tests we made. It was satisfactory and convincing of the other observations we made with empty machines. When we made these tests in the machine, to the best of my recollection, the machine was filled with eggs.

Proceedings adjourned to Thursday, February 8th, 1934, at 10:00 A. M.

Proceedings Thursday, February 8th, 1934, 10 A. M.

WILLIAM N. WILLETT, a witness on behalf of the Defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

I am Assistant Engineer at the James Manufacturing Company. I have been there about three years and eight months.

I have had occasion to test the fans of the Smith Incubator Company, put in their so-called Smith machine. I am familiar with what has been called the new style fan [fol 501] and the old style fan. We ran standard calibration tests on those fans as recognized by the American Society of Heating and Ventilating Engineers, to determine the capacity of the fans. I made a record of the size and dimensions of the fan blades and a record of the tests made.

Referring to two papers, the top diagram is the diagram of the so-called new style fan; the second chart is a chart of the capacity, air capacity, the volume delivered by a fan consisting of four of these blades running at 1,630 revolutions per minute. That is the standard speed for that fan as I understand it. The free air delivery according to this test would be 2,020 cubic feet per minute.

With reference to the documents now handed me, the top document is the diagram of the so-called old style fan blade and the second graph is the result of the capacity test run on such a fan running at 1,630 revolutions per minute, which I understand is the correct speed of the motor. The air delivery, the free delivery is approximately 1,085 cubic feet per minute, which is approximately one-half of the new fan.

(Defendants' Counsel then offered the four blueprints in evidence as a single exhibit and they were admitted as Defendants' Exhibits Nos. 74-A, B, C and D, data on Smith fans.)

I recall that last week, at the end of the session, there was an arrangement made by which Dr. Greene and Mr. [fol. 502] Taggart would go together to Frenchtown, New Jersey, to the Kerr Hatcheries, to take the speed of the air in a completely filled Smith incubator. I arrived in

Frenchtown, New Jersey, on Saturday last at about 1:20 P. M. I went to the Kerr Chickeries, as the firm is styled, and talked to the young Mr. Kerr. I told him that Mr. Taggart and Dr. Greene had agreed to meet at the Kerr Chickeries and test the speed of the air in the machines at at place. I asked Mr. Kerr if he had heard from Mr. Taggart, and he replied that he had heard from Mr. Taggart. Then, I asked Mr. Kerr if he would give me the data on the number of eggs which were in his machines and he told me that of his some twenty machines, machines Nos. 1, 2 and 3 were full of eggs and they were hatching, that is completing getting the chicks out of those three machines. Machines Nos. 4, 5, 6 and 7 were partially filled with eggs. Mr. Kerr asked me what he could do for us and I told him that we had no requests to make; I was just there to see that we would get fair play, and he assured me that we would get that and then I went to the hotel in Frenchtown and had dinner.

While I was at dinner, I ascertained that Mr. Taggart had had dinner at the same place, and I asked if Mr. Taggart was staying at the hotel and they replied that he was not. Then, I went back to the Kerr Chickeries. When I got there I asked one of the workers if I might see Mr. Taggart and he said, "Mr. Taggart is in Machine No. 3", and indicated that I might walk back and see him. I walked back and when I got there, I saw on the floor in front of [fol. 503] the machine a suit case containing at least four anemometers and other instruments for measuring various things in the incubator; speed, for instance. I also saw a brief case in front of the machine, as well as a hat and a couple of coats. On the other side was a pile of egg cases; in front of Machine No. 3, I saw three complete or four complete fan assemblies, including the motor and blades, assemblies including motors and blades and frames with which they are put into the machine of the style which is the so-called new type of fan. Then, I waited until Mr. Taggart came out of the machine and I greeted him and said, "Mr. Taggart, how are you getting along?" Or words to that effect and he replied he was getting along nicely, that he had the curtain with the celluloid window installed and ready to use. Then, I asked him if he had changed the fans in the machine and he replied that he had taken out the new style fans, which were lying in front of

the machine and installed the told type fan, which he had taken out of another incubator which was not then in use. According to Mr. Taggart, the new style fans had been taken out of Machine No. 3, and he was installing the old type fans in No. 3.

I talked to the operator of the machines, and after Mr. Taggart had indicated that he was leaving for New York immediately, and the operator told me that he thought that it would be all right, that it might be all right to leave those old style fans in the machine until Tuesday, but that they did not furnish enough air. After I left the premises on Saturday last, I returned on Tuesday morning, reaching Frenchtown about ten minutes after nine in the morning [fol. 504] and some time later Mr. Shodrun and Dr. Greene came in, as I understand it from Frenchtown. Mr. Taggart was there at the time I arrived and when Dr. Greene and Mr. Shodron arrived, we asked Mr. Taggart whether or not he had changed the fans and he replied in front of the three of us that he had changed the fans as I have just described. We did not proceed with the tests at that time in view of these changes.

Mr. Toulmin, Jr.: You may have the witness.

Cross-examination.

By Mr. Ely:

Q. With regard to these matters at Frenchtown, New Jersey, was it explained to you by Mr. Taggart that, at the time Dr. Greene was at Frenchtown making his observations of the machines, that those machines had, at that time, what you call the old style fan in them?

A. No.

Q. That was not explained to you?

A. That was not explained to me.

Q. You are positive Mr. Taggart did not tell you that? You want to say that Mr. Taggart did not tell you that?

A. I cannot recall that Mr. Taggart said that the old style fans were in at the time that Dr. Greene made his test.

Q. Did not Mr. Taggart tell you that this so-called new style fan had just been installed in those incubators this year?

A. He made some statement to that effect.

Q. And then, if those new style fans were installed this year, they had the old style fans last year?

A. I can't recall the latter part. That might follow, but I can't recall that we discussed that.

[fol. 505] I do not recall that it was told to me that the only machines they had at the Frenchtown plant which had the old style fans in them were machines that were not full of eggs. I do not recall that statement being made to me at all. As to Mr. Taggart telling me that the reason why he put the old style fans in the machine which they proposed to test was to duplicate the conditions as they were when Dr. Greene was there in the fall, I can't remember any discussion to that effect. I do not remember that at all.

We refused to go ahead with these tests with that machine with the old style fans in it. We refused to participate in any test. We took that position on the advice of our attorneys. I did not call Mr. Toulmin on the 'phone. I wrote him a letter. I consulted with Mr. Toulmin on the matter. Whether I told Mr. Toulmin that these old style fans that Mr. Taggart was putting in were the fans which had been used at the time Dr. Greene was there in the fall, I couldn't tell him that because I didn't know what fans were in the machine at the time Dr. Greene was there.

I knew that there were new style and old style fans in the machines at that place.

Q. Yes; and you knew that the machines which were full of eggs had the new style fans in them. You knew that, did you not?

A. I knew that No. 3 at least—I didn't go into any of the other machines except No. 3, and I knew from Mr. Taggart's explanation that he had taken out the new fans from No. 3 and put the old fans in. As I remember it, Mr. Taggart told me he got the old fans from machine No. 14. Mr. Taggart offered to make tests in our presence in the other [fol. 506] machines in which the new style fans were running, machines which were full of eggs. We refused to do that, to participate in those tests, because we did not know whether he had made any other changes. I did not ask him whether he had made any other changes. I did not take that matter up with our attorneys as to whether we

should participate in tests on the machines with the new-style fans. The leadership of the three was in hands of Dr. Greene, and I believe that Dr. Greene would be able to testify on that matter. I recall that Dr. Greene telephoned our attorneys, and I was not present and I do not know what was said or done at that point.

These charts that I furnished, that is, these blue prints which have just been offered in evidence, they are not results of any tests of actual air speeds in machines in operation. They are comparative tests of fan capacities on the two types of fans, the old and the new style type. I do not know when the new type fan was put in by the Smith Company. The old style is the type of fan which is over at the demonstration place.

Q. And Mr. Taggart then offered to put in the very same fans that you have over here at your demonstration place, in the incubator full of eggs, and yet you would not participate in any tests under those conditions, is that right?

A. Mr. Taggart refused to commit himself on the pitch of the old style fans. He says he does not know what the pitch of those fans are, and in the light of that, we refused to go ahead.

Q. You refused to go ahead and make any tests whatever on the advice of Counsel?

A. On the advice of Counsel.

[fol. 507] By the Court:

Q. Who owns these machines down there?

A. They belong to—I say "belong"; the Kerr Chickeries, Inc., has 20 machines. Now, I don't know how the financial arrangements are handled between Smith Incubator Company and Kerr Chickeries.

Q. Who has control of the machines down there?

A. The control of the machine is with the Kerr Hatcheries, Inc.

Q. Is that a separate institution from the plaintiff?

A. It is an independent hatchery.

Q. Who has the say as to who shall go into these machines and what shall be done with them?

A. The Kerr Chickeries.

Q. I mean, did you, or Taggart, or anybody, do anything you wanted to with these machines without some——

A. I suppose—I can only suppose that any changes which are made on those machines would have to be made with the consent of the owner, the Kerr Chickeries.

Mr. Ely: That is exactly what happened, your Honor. Mr. Taggart got permission to put the same fans in that were in at the time when Dr. Greene was there, and he also offered to go ahead and make the tests on both machines.

Q. You said machines one and two had the new fans in?

A. I understand that but I can't make any definite statement because I have not seen them, and I didn't ask any definite questions on that point. However, I understand that the new fans are in Machines 1 and 2 which are filled with eggs.

Q. How could you test them both? Did you have any [fol. 508] way of testing both?

A. Our Counsel—I was merely down there under orders. I couldn't make any decisions of my own; and after conferring with our Counsel and giving them the facts of the case, we were advised not to go ahead with any test, in view of the fact that we did not know whether changes had been made on the other machines or not. We have no way of knowing——

Q. Would not the corporation know what changes were made on their machines?

A. They should know, if the participants—if the workers made only the changes which they were asked to—or had asked permission to make.

By Mr. Ely:

Q. Did you make any inquiry as to whether any other changes had been made except putting in old style fans? Did you ask whether any other changes had been made?

A. Yes, I asked.

Q. What did they tell you?

A. The operator didn't know of any other changes which had been made.

Q. So the only change that had been made, then, was to take that No. 3 machine and put in the old style fans that were in the machine at the time Dr. Greene was there last fall? That is true, is it not, so far as you know?

A. I can't say which fans were in there when Dr. Greene was there last fall, because I do not know.

Q. Well, assuming that that was the fact that, as we will show, when Dr. Greene was there in the fall, the old style fans were in the machine, then the only change which had been made, so far as you know, assuming that to be the fact, was to put those machines in exactly the condition they [fol. 509] were in at the time Dr. Greene was there last fall.

A. I can only testify as to the fact which I know.

Q. I ask you to assume——

The Court: I think his answer already appears, to that question.

Mr. Ely: All right, your Honor; then I will not go ahead with that any longer.

The Witness: I am familiar with the means in the James Way machine that propels the air through the machine. As to having spotted results in the incubation in the James Way machine, I was not present at any of the hatching tests which Mr. Shodron testified to yesterday. I do not know what the results of that are, except from hearsay. I am not familiar with the machine out on the market. I am not a field man. I do not know whether they get any spotted results from that machine. I do not know whether different results are gotten in eggs at different points in the incubator, or whether it is uniformly good hatching throughout the incubator. I am not familiar with the field results at all. I couldn't tell you who would know about that. My function in the organization is a researchist and engineer, and I am not familiar enough with the set-up of the organization. I don't think I have ever seen that machine actually operated as a commercial hatcherman operates it.

If there were spotted results, or non-uniform hatching throughout the James Way machines as they went out on the market, that fact would not necessarily come to me as a research man to determine the reason for such results. Our company manufactures other things than incubators. [fol. 510] We manufacture brooder stoves; at the present time we are building steel barns and steel silos, and that sort of thing, and my function is not only to watch the incubator. I cannot spend all of my time with the incubator, and I am not familiar with those results.

Q. You have never heard of such a thing as a non-uniformity of hatching throughout the James Way incubator, have you?

A. I am not familiar with that.

I don't remember ever having heard of a decided spotted condition that is different results throughout the machine in the James Way. It is possible I would hear of such a thing in my connection with the company, if such a thing had occurred. I wouldn't say probable.

Mr. Taggart, in my presence and in the presence of the other representatives of James Manufacturing Company, offered to make tests in any machine whatever that was in operation at the Frenchtown Plant. We did not go ahead and co-operate with him on that.

Mr. Ely: That is all.

Redirect examination.

By Mr. Toulmin, Jr.:

As to the influence the pitch of the fan blade has on the quantity of air that is delivered, if we consider that the fan is turning at the same speed, if we have a flat, an absolutely horizontal fan blade, we get absolutely no delivery. If we pitch it a little bit, we get more delivery, and if we pitch it more, we get more delivery, and as we go on up. It is essential to know the correct pitch of the fan blade in order [fol. 511] to determine that fans are comparable. In other words, we would want to know whether the fan which we are going to test had the actual pitch that the manufacturer intended for it to have.

Mr. Toulmin, Jr.: That is all.

Mr. Ely: Nothing further.

John George Shodron, recalled as a witness on behalf of Defendants, testified as follows:

Direct examination.

By Mr. Toulmin, Jr.:

I attended the proposed tests at Frenchtown, New Jersey, at the Kerr Hatcheries, such as have been just de-

scribed by Mr. Willett. I attended with Dr. Greene and Mr. Willett. Dr. Greene met me around 8:25 at Princeton Junction, and we drove over from Princeton Junction to Frenchtown and arrived there somewhere in the neighborhood of 9:45, to the best of my recollection. Dr. Greene led the way into the building and I accompanied him. We saw Mr. Willett standing there, and Mr. Taggart, and walked right over to him, in front of the machine numbered 3. I said nothing while I was in the building. Dr. Greene asked Mr. Taggart if he had changed those fans. Mr. Taggart said "yes".

I made an investigation into incubator No. 14 from which these new fans that were put into No. 3 were supposed to have been taken. I walked throughout the entire [fol. 512] hatchery, examined each machine from the name plates on the door, and arrived at No. 14, the door of which was open. I stood in front of the door, looked into the machine, saw that the fans had been removed. No. 14 had been hatched in; it was not a thoroughly clean machine. I asked Dr. Green to ask Mr. Taggart to take us into machine numbered 3, and he did so. Mr. Taggart took us in, and while walking in, I reached up above my head in order to observe what the air delivery of the fan was. I then asked Dr. Greene to ask Mr. Taggart to lower down one of the fans, as I would like to see the fan; so Mr. Taggart lowered the third fan from the top. This was a fan that was supposed to have been taken from the dirty machine, No. 14. I would say the fan that I found in No. 3 was clean. Four fans were taken from No. 14. It is my understanding that four fans were taken out of No. 14 and moved over into No. 3. I only inspected one because I did not want to shut down the complete incubator.

Incubator No. 3 had eggs in it in process of incubation. I could see through the transparent window, or cellophane window that Mr. Taggart said he put in there. When we got one of the fans in No. 3, which was supposed to come from the dirty machine 14, opened up, that is stopped and let down, I would say it was clean. When you clean a fan, those thin metal blades, as to the pitch, may be distorted. As a matter of fact, they frequently are, if you are not careful.

Mr. Toulmin, Jr.: That is all, of the witness; you may have him.

[fol. 513] Cross-examination.

By Mr. Ely:

That No. 14 machine did not have any eggs in it, as far as I could see; the machine was not lit up brightly; there were no lights. It was not working. Machine No. 3 was working, but I couldn't say whether it was full of eggs or not. I observed eggs through the cellophane window in the curtain The machine was operating. I don't know what fans were taken out of that No. 3 machine. I saw some fans on the floor in front of the machine. I heard in the conversation that those were fans that came out of that machine. They had been used for some time. I could not tell how long they had been used.

Spotted results are not gotten in the James Way incubator, not to my knowledge, if the machine is operated with the air mixer.

Q. And you will get the same results wherever the eggs may be placed, as far as anybody is able to determine? You do not have localities in there where you get results and some where you get good results?

A. I don't know.

I don't know of any spotted results in the James Way machine, if the machine is in operation as it is built to operate. In the James Way machine, the eggs are supposed to stay in one spot the whole time they are in the incubator. The result, to the best of my knowledge, is the same whether the eggs are put in one corner or down in another, or wherever they are located in the trays. I have never been able to observe any difference in the results, due to the location of eggs at various spots.

[fol. 514] By the Court:

Q. Just a moment. You said you examined these blades. You said they were liable to be distorted by reason of being cleaned. Do you say these blades were distorted?

A. I can't say whether they were distorted or not, because I didn't touch the blade nor did I measure the blade.

Q. Knowing that that might result in a change after being cleaned, would you be able to tell by looking at them whether they had been distorted?

A. Not by looking at them, but if I could take the blade off the motor and lay it on a flat surface and measure the pitch——

Q. You think it would not be observable by the eye?

A. Not in a general way.

By Mr. Ely:

Q. Now, those fans, in the operation of the Smith incubators, get fouled with various things, do they not? They get dirty?

A. They get dirty.

Q. And in normal operation of an incubator of that kind you clean those fans periodically, do you not? That is a normal operation?

A. I don't know whether that is a normal operation of the Smith machine or not.

If they clean the machine, I would assume that they would also clean the fan blades. That would be part of the normal upkeep of the machine.

[fol. 515] ARTHUR M. GREENE, continued as a witness on behalf of the Defendants, and testified as follows:

Direct examination resumed.

By Mr. Toulmin, Jr.:

Q. Dr. Greene, did you attend the proposed test of the incubators of Smith at Frenchtown, New Jersey?

A. I did.

Q. Will you please describe who went with you and what happened?

A. According to agreement when we left Buffalo, I was to meet Mr. Shodron on the 7:15 train from New York which reached Princeton Junction about 8:25. I also went east with Mr. Willett. We thought it advisable to have Mr. Willett go to Frenchtown to see if any changes were going to be made. No. 1 machine was the machine which I tested, and although nothing was specified about the machine to be tested, I fully expected that No. 1 would be the machine. We reached New York about a little after seven——

Q. In the morning?

A. In the morning, on Saturday, and Mr. Willett went on to Trenton, and he hoped to get away from there in the morning, but he didn't get away, so, according to his letter to me, he reached there in the afternoon and found, according to his statement, that Mr. Taggart had changed the fans, and that there were a number of anemometers lying around.

He stated that he had sent an air-mail letter to the attorneys and to the representative of the company, the execu- [fol. 516] tive officer here, and then we waited until Monday, when I received directions that if the statement made by Mr. Willett was true, that not knowing what changes had been made, we should not make any tests.

After meeting Mr. Shodron on Tuesday, as per agreement, and driving over there, we agreed with Mr. Taggart to meet there at 10 o'clock. We were a little ahead of time, and after the usual greetings, I asked Mr. Willett and Mr. Shodron to come near me, as I was talking to Mr. Taggart, and I asked him if he had made changes, and he said he had; and my understanding from him was that he had taken the fans from the No. 14 machine, which I understand had nothing in it, and had moved that over to No. 3.

When I told him that we would not make the test, he suggested that we make a test in No. 1, and that would be with the new fans. Being an engineer, and liking to make tests, I said that I wished I could make it, and I would call the Counsel and find out if they would permit it. Again, we did not know what changes had been made in No. 1. Now, a curious thing has happened. As I reported to you, Sir, in the summer——

Q. Summer of 1933.

A. When I went to Frenchtown to make the test, in order to get definite data for the Smith machine, I was told by someone at the plant, your Honor—I do not know who—that the fans had been changed and fans of larger capacity had been installed.

Q. It was after that, that you made your test?

A. Yes, sir.

[fol. 517] The Witness: I asked the workman who was with Mr. Taggart if the fans had been changed, and he said they had not been changed.

The Court: You mean, No. 1?

The Witness: In No. 1, yes, sir. That is, the statement which I made was in error, I then asked Mr. Weisel, the manager, whom I had met on the previous test—or on the test—and also had given me permission to make this test, I also asked him, and he said they had not been changed.

The Court: You mean, from the time——

The Witness: From the first ones put in. The measurement which I made on the air discharge is surely larger than the smaller machine, according to my figure; but I understood that they had been changed, and therefore, to say that we know that the No. 14—the fans in No. 14 were the fans in No. 1 when I tested them, I couldn't say that at all, and we have no absolute evidence that that was so. However, as there had been changes made without any notice to us, we did not know what other changes had been made, if any; and acting on directions, which I think are proper, no tests were made.

Q. Have you before you, in your record note book, the record of the tests that you yourself made in the summer of 1933, to which you have just referred?

A. I have my notes of the test made at Frenchtown on the [fol. 518] so-called No. 1 incubator of the Kerr Hatcheries, Frenchtown, New Jersey, on August 26, 1933. At this time I measured the discharge as best I could with an anemometer, and I found the velocity of discharge of the 16-inch area to be 1,150 feet per minute, which gives 1,603 cubic feet per minute.

At this time the machine was in operation and substantially filled. I didn't look at all of the racks. Chicks were coming out of the shell, as I heard the little squeaking, and those racks which I did look at were filled to the top. They told me at that time that No. 1 machine had been in constant operation for about three years.

Q. And did you test the air speed between the trays behind the curtains—you have testified about that, I believe?

A. I had no cellophane window to look in. I wanted to know something about the speed of the air passing up between the trays, and so I set my anemometer to zero. Pulled the curtain back, hastily got in, placed the anemometer as near as I could in a horizontal position, started it when my watch had its second hand at zero, jumped from behind the curtain, and closed the curtain in; and then at the end of four minutes I got in again and stopped the

anemometer at the time and took the reading for five minutes—or four minutes, and the speed per minute which I found was 165 feet per minute.

By the Court:

Q. What tray?

A. Between the trays, your Honor, 165 feet per minute upward between the trays.

[fol. 519] Q. What height?

A. I beg your pardon, Sir.

Q. What height?

A. About half way up the trays. That is just at a convenient position for me to move the anemometer in.

By Mr. Toulmin, Jr.:

Q. How did you support the anemometer between the trays, Doctor?

A. The anemometer lay on the two opposite trays, that is, the bottom of one tray and across to the top of the other. It was slightly inclined, and it was a little bit larger than the space, so it rested over the edges.

Q. Now, Dr. Greene, will you proceed with the discussion of the prior art that we left off with when you were on the witness stand before?

A. Shall I follow the large chart?

Q. Have you your prior art volume?

The Court: We were down to——

The Witness: We were down to No. 18, your Honor, I believe, the Proctor and Knowles Patent 432,282. I think I had finished describing that when adjournment was taken.

Q. That is correct. Now, start at the next one.

A. No. 19 Exhibit on this sheet is a reissue patent to Proctor, 11,460, of 1894. It is entitled, "A drying machine," and represents a method of treating air as shown in Fig. 1, to properly treat material placed within the cabinet. There is a forced draft fan, indicated merely in a conventional way, which forces air over heating coils, and this air then [fol. 520] passes around the material to be treated.

An outlet at the top, marked "D", permits air to exhaust whenever fresh air can enter, and in this machine the fresh air is permitted to enter through the ends of the trays supporting the material to be treated.

This indicates an invention for the proper treatment of eggs by air currents produced by fans, which are controlled as to their properties for the proper handling of material.

The next prior art patent, No. 20, is that to Schwartz, 535,175, of March 5, 1895; and although this patent has a number of figures illustrating changes which may be made in the structure, following the teachings of the patent, Fig. 5 has been selected for this chart, and in Fig. 5 we find a cabinet of large size, so large that the material to be treated has to be run in on racks, running on small wheels on a track. These racks are placed into compartments on the side, and from the size, the space may be large enough for the entrance of men.

There is a forced draft propeller fan at the top, which in this case exhausts air from the central passageway and passes it down to the side passages, where it is properly cooled in order to remove the heat that has been given up by the treatment of the material, and then this air is properly humidified by a vessel at the bottom which contains water and heating coils to bring the water to temperature above that of the air, so that the vapor given off from this warm water will be sufficient to properly condition the air for the material to be treated.

[fol. 521] Fig. 5 shows this air current entering the chambers in which the material is held, and then passing out through openings in the side into the central passageway.

By the Court:

Q. What are those pipes C^3?

A. C proper is a little spigot——

Q. I understand that; C above that, C^3?

A. C^3 is a device for cooling the air. In the earlier figures, your Honor, he uses a coil of refrigeration. In this particular case, however, he throws a spray of water in here for the purpose of refrigerating or cooling off the air to proper temperatue.

Q. Cool it and then heat it?

A. Yes, and that warms the water—not so much the air as the water.

By Mr. Toulmin, Jr.:

Q. And the water in turn warms the air?

A. Yes, it does.

Q. In other words, you get a balanced temperature by opposing heat on one side and the cooling effect on the other, is that correct?

A. Yes. Very often, in the treatment of air for ventilation work, we have it cooled to such a temperature, cooled by spray, to such a temperature that its moisture content in the saturated condition gives the moisture which is needed in the room. Then we pass this air over a heating device and bring it up to temperature again for the proper [fol. 522] temperature condition. We will see that in one of the later patents.

The next one on the sheet is that to Schwartz, No. 535,175, the same one as we have here, but he is now referring to Fig. 1 of the patent, and your Honor will see, the coil of pipe marked C^1 in this picture which is the refrigerating coil, which in Fig. 5 has been replaced by a spray and in this particular Fig. 1 he has only one chamber for the treatment of his material.

No. 22 is the patent to Proctor 553,723 of 1896 and in this selection, No. 1 figure has been reproduced there and in this we have the propeller fan driving the air downward instead of upward as in the previous patent. Right above that fan, supplied by the pipe G is a centrifugal humidifier D^2 or C^2, which is merely a rotating disc, on which the water is discharged and then it is formed into a spray by the revolution of this device. This humidifier is placed directly over the fan C. The air then is discharged downward, distributing its excess moisture, if any, into the pan at the bottom H^3 and then if there is a deficiency of moisture, the piece of fabric H^1, which dips into this water is, by capillary action, kept in a wetter condition and will give up moisture to the air if the air is not of the proper humidity. The air then passes and comes to the bottom, mushrooms and goes up through each chamber, passing over the material to be treated by this conditioned air and then enters the middle compartment and in this device, of course, the spray at the top can be used to take out heat which may come from the fabric, to be treated.

[fol. 523] We now come to Figs. Nos. 23 and 24, which are taken from the Verna patent, 891,019.

Q. Dr. Greene in the interest of economy of time, I suggest that you skip over Verna and go to the next one which I think is Freas?

A. The next drawing, No. 25, is taken from Fig. 3 of the Freas patent 1,165,958 of 1915. This device, your Honor, is called a heating system for constant temperature baths, and it is used by biologists for the incubation of organisms; it is used by the chemist or physicist for holding a material at a fixed temperature. In looking at this figure on the large chart we find a propeller fan at the left, No. 27, which is driven by electric motor 23 on the outside of the cabinet.

Q. Dr. Greene, is not the fan 26 and the opening 27?

A. You are correct, the fan is 26 and the opening near the center of the fan for the return of air is marked 27, which is by mistake. The shaft No. 24 is placed within a tube, which has a damper 30, 31, over its end, and by moving this damper we can control the amount of fresh air admitted into this device. At the center of the chamber of this device is No. 19A near the top and also near the bottom. These are outlets which are capped over by a spring cap so that whenever an amount of fresh air is introduced through 30, 31, and pressure is thereby built up, these outlets are opened to the atmosphere to allow whatever is in there to go out; if this was a Smith machine, it would, of course, be foul air. The propeller fan drives the air in this case outward and down through the passage ending at 29, it is shown by a dotted [fol. 524] arrow. The air then passes over heat coils 32 and 33 and enters the cabinet in the front; it then distributes itself through this cabinet, returning to the fan, and after making its circuit. Now, the purpose of the machine with the baffle plates or shelves 13, 13, is to give, as treated, a constant temperature bath. There is a thermostat arrangement inside, which hangs down at 77, a large bi-metal thermostat, which controls the amount of heat in the heating coils and in this way the machine gets the necessary heat to maintain a fixed temperature. If the material itself gives out heat then, of course, the heating coils will be shut down. On the other hand, if the material within requires or takes up heat, then the heating coils will be started.

The walls of this machine are shown cross hatched, also the door, representing an insulated chamber in which a constant temperature is controlled and the thick walls prevent the waste of heat by transmission.

In this machine we have the admission of fresh air, the mixing of it with the return air, the discharge of excess air

and the maintenance of a proper temperature which is constant.

Q. Now, will you proceed to Nos. 26 and 27, which are the same, and 28, are the same machines, as I understand it?

A. These devices, shown in Nos. 26, 27 and 28, are the figures from the Schmidt and Schutterle patent 1,010,809, and as seen from Fig. 1, the device is a cabinet of large size so that a man can go in through the doors, and as shown in the next figure of the chart, which is Fig. 2 of the patent, a cross [fol. 525] section, a cross vertical section, will show that within this device there is a propeller bladed fan B, which drives the air through the shelves or racks, because these shelves are mounted on wheels R and the air then returns above at the ceiling 10 to be re-circulated after passing over the heating coils E and being humidified by the spray head 15. It will also be noted both in Fig. 1 and also in this Fig. 2 that there are trap doors 9 through which foul air can be discharged. Then the fresh air is brought in through No. 7, as the patent states on page one, line 84 and line 85, the bottom rear door 7 may be raised more or less and sustained in the raised position by the chain 8 or its equivalent and in that case the exit or exhaust would be by way of door or doors 9: At the top of the apparatus the circulation of air being through the exhaust fans or blower and through the dryer compartment beneath the false top 10. Starting, however, at line 81, it speaks of this admission of air. Fig. 5 merely shows the same view, showing the grillage through which the air has to pass after leaving the fan, to be broken up and made parallel. It shows the spray nozzle 15 and it shows the coil controlled by the stop valve 3.

Q. Now, will you for the purpose of economy of time, go over to the Goldstein, No. 32?

A. It is Goldstein 1,137,752. This Goldstein——

Q. Just a moment, Doctor?

The Court: It is the one we had before.

The Witness: No. 32 of the Goldstein patent is followed by—first of all, Fig. 1 of that patent and the chart also [fol. 526] shows Fig.——

The Court: Is that the one of which you had the model?

Mr. Toulmin, Jr.: Yes, we have had that.

The Court: We have gone all over that.

Mr. Toulmin, Jr.: That is the one Professor Halpin testified about yesterday. May I ask a couple of questions to shorten this.

Q. In this Goldstein patent, Dr. Greene, do you find a provision for the circulation of air in a circuit, the application of heat, the control of heat, the application of moisture and the control of moisture?

A. I do.

Q. What provision do you find for the control of ventilation in the Goldstein apparatus, for fresh air and foul air?

A. I find no specific arrangement in the patent for the circulation of the air builds up a pressure and it is my opinion that from the high pressure parts of this machine there would be a leakage outward and from the low parts of the machine there would be a leakage inward.

Q. When you open door 8 from time to time, you would supply fresh air and let the foul air out, is that it?

A. Yes, the part numbered 9 at the bottom, in my opinion, is the place of sub-atmospheric pressure and part 9 at the top is a point of super-atmospheric pressure. The fan 12 is that which produces this circulation; as in the incubator [fol. 527] built on these particular disclosures, the temperature is controlled by 11, which is a coil heated by the boiler 14, by the valve 25 admitting steam or hot water into this system which is controlled by the thermostat 20. 21 is a hygrostat which controls the admission of energy into the water bath 13, which boils some of the water off and humidifies the circulating system of air, which goes into the cabinet at the top, and passes through and out at the bottom and makes a circuit again.

Q. With respect to the Proctor, Schwartz and Goldstein machines, of which we have samples built up over in the demonstration room, my understanding is you testify those samples were correct representations of those patents, is that correct?

A. I have checked the machines which were exhibited there and are exhibits in this case against the patent drawings and I believe they are correct representations of the teachings of the patent.

Q. Will you go over to No. 37, the Peters' patent?

A. This patent, your Honor, No. 37.

Q. 843,909?

A. Of 1907 is a device for——

Mr. Toulmin, Jr.: Just a minute, Doctor, until his Honor finds it.

The Court: I have it.

The Witness: The figure in No. 37 is taken from the only figure of the patent. This is for the proper conditioning of the air introduced into some chamber. Air is introduced through the outlet marked 23-A; three being shown in the patent drawing. The air from this room is then returned [fol. 528] through the duct 11, underneath the floor, entering that duct from registers 49 and 50 in the side walls of the room. This duct may be under low pressure produced by the suction of fan 16 or if there is sufficient heat pressure introduced into the room, it may be above atmospheric normal. It would be sub-atmospheric in No. 11. Then, at the extreme right of this duct 11 are a pair of dampers No. 12, controlling the amount of suction from the fan on the air from the room. There is a damper 13 to which fresh air can enter the system, if the operator desires a greater amount of fresh air, because of high CO2 content, the carbon dioxide content. Damper 12 is almost entirely closed and damper 13 is open to allow pressure to build up in lane 11, duct 11, so then the air will, by its own pressure, open the damper 34 in the vertical 54 in the vent pipe 52, leading to the roof. However, if only a small amount of air is introduced from the outside through the damper 13, then, the sub-atmospheric pressure within the room causes the damper 54 to close and fresh air does not enter through 52. Now, after the air reaches the fan 16, whether it be re-circulated air, entirely fresh air or a mixture of fresh air with re-circulated air, this air can be sent over the coils 15, which are for the purpose of chilling that air, to reduce its moisture content. The water taken out of the air drops to the bottom and [fol. 529] escapes through the trap marked 35. If the air does not require drying, then, the damper 28 is closed and all of the air delivered through the fan passes through the duct 26, and does not go through the refrigeration section 15. We now come to another figure in which there are steam coils, 20. Thereby by-passing some of the air from the pipe 37 and sending it over these coils, we can warm that air to the proper temperature for entrance into the room. Then, finally we have a pipe 48 in the duct 22, which is a steam pipe to put in extra moisture if that is needed. The de-

vices marked 35, 36 and 37, out in the room are therinostats and hygrostats to properly control the humidity and temperature, or better the temperature and the humidity of the air in this room. In this device, as Peters and Hungerford describe, we can control the conditioning of the air for its purposes within this chamber. Such devices, your Honor, are arranged in Courtrooms, theaters, chocolate manufacturies, for the manufacture of chemicals, whereof necessity temperature and humidity of the air movement would be required.

Q. Now, Dr. Greene, right there, is that apparatus of Peters adapted for the conditioning of air for temperature, moisture and ventilation for places where people gather, human beings gat-er?

A. It is used for that, but it is used also for other places, [fol. 530] but it is used for places where human beings gather.

Q. It is a fact, is it not, that where human beings gather they give off moisture, they give off carbon dioxide, they give off heat and must take up heat and must have some moisture supply and must have fresh air to be comfortable, is that right?

A. That is correct, and device 18 is to remove any excess heat, it is a cooling coil. Device 20 is to add heat when necessary.

Q. That is another instance of balancing heat against cold, effected as in the case of the Smith incubator, where we find a heating coil and a cooling coil?

A. That is correct.

Mr. Toulmin, Jr.: That is all with the witness, you may have him.

Cross-examination.

By Mr. Ely:

Q. First, with respect to this flurry down at Frenchtown, Dr. Greene, when you were there, Mr. Taggart offered to take you into No. 1 machine and make tests there?

A. He wanted to do it.

Q. And you wanted to do it?

A. I expressed the opinion that I would like to do it, having been there with all our equipment, and being an engineer.

Q. But, instead of doing that, you picked up your dolls and went home?

A. We believed that to be the proper thing to do because we knew nothing about what was done; some changes were made without our knowledge, without our consent.

[fol. 531] Q. You were suspicious the whole business was changed?

Mr. Toulmin, Jr.: Let him finish his answer.

Q. Go ahead.

A. We were to go there and test the machine and when I got this message from Mr. Willett, I was surprised, and shocked, that without any consent these changes should have been made because if there had been changes, Mr. Ely, the ratios would have been all that we wanted. That is, if this machine handled twice as much air as the standard machine, which Mr. Taggart has told us in Court, and we got a velocity of a certain amount, we could divide that by two. Moreover, Mr. Taggart stated in our presence that these new fans did not discharge substantially more air than the old and it was primarily for the purpose of taking care of the over-heating of the motor. That being the case, it seemed very strange to me that the old fan should have been put back. Moreover, I did not know which fans were in there when I made a test.

Q. Well, I think he did because I think the Smith Incubator Company know what machines are at what places, but as a matter of fact you did not make any actual tests then?

A. No, that is correct.

Q. But in the test you did make when you were in Frenchtown last fall, the actual measurement you made was a speed of 165 feet per minute?

A. Yes, sir.

[fol. 532] Q. What difference does it make so far as you know with respect to the eggs, whether the air is going at 135 or 165 feet per minute?

A. I only know that Mr. Smith teaches in his patent that high velocities are necessary.

Q. I beg your pardon, I did not ask you that question.

Mr. Toulmin, Jr.: Let the witness answer.

Mr. Ely: No, he has to answer my question.

The Court: He had to answer the question asked.

(Preceding question and answer repeated by the stenographer as follows:

"Q. But in the test you did make when you were in Frenchtown last fall, the actual measurement you made was a speed of 165 feet per minute?

A. Yes, sir.

Q. What difference does it make so far as you know with respect to the eggs, whether the air is going at 135 or 165 feet per minute?

A. I only know that Mr. Smith teaches in his patent that high velocities are necessary.")

Q. Will you answer my question, please?

The Witness: Your Honor, I am answering the question.

The Court: You say your only source of such knowledge is what Smith teaches?

The Witness: No, I am coming to the next part of it. I [fol. 533] have not answered the question.

The Court: That answer is "yes" or "no", I think.

Q. Do you know whether it makes any difference to the eggs whether the air is going at 135 or 165?

A. I do not know.

Q. You do not dispute, as I undestand it, and you are willing to adopt these charts of Mr. Taggart's with regard to the speed in the James Way machine, are you not, Exhibit No. 24?

A. We have no other data before the Court so I have adopted it as given by Mr. Taggart.

Q. In that chart you find at various points a variation of 120 feet of air a minute and 160 feet of air a minute and 190 feet of air a minute, do you not?

A. I do.

Q. You heard Mr. Shodron testify this morning that the results of incubation were the same th-oughout the whole of the James Way machine, they had no spotted results, as he called it; you heard Mr. Shodron so testify this morning?

A. He said, "spotted results". By "spotted results", I imagine there were no places where eggs were not incubated properly. I don't know what "spotted results" mean.

Q. And the eggs in the James Way machine are put in one place and stay in the one place during the whole time?

A. They do.

Q. And you take it from those two facts, whether the air is moving at 120, 130 or 160 feet per minute, or possibly 110, that does not make any difference to the eggs?

A. Judging from the outside results, it is correct.

[fol. 534] Q. There is nothing in the Smith patent to say what velocity must be used in feet per minute?

A. That is correct.

Q. It simply says that air must be moving with sufficient velocity so as to circulate, maintain and diffuse a temperature the same throughout?

A. In one place, that is correct.

Q. And it does not apparently make any difference to the eggs, whether the air is moving at 165 feet, as you found it in the Smith machine, or 135 feet as you find it in the James Way average; is that true?

A. Well, I made one reading only. The 165 feet which I have testified to this morning was taken by, as I explained, pulling back the curtain, while in there, and putting the anemometer in place, the curtain now away, putting it back, and waiting for approximately three or four minutes and then entering and then reading which I had gotten was at one place only. I do not know what the average velocity would be. I have computed it very carefully and have already testified to the fact that given an area of, let us say, twenty per cent of the net area, and given six thousand feet per minute, and the area being of seventy-five feet, the average velocity through those openings should be, as I think I said, somewhere about 260 feet. My reading was 165.

Q. That 260 feet velocity you got was something you got from pencil and paper deduction, it was not an actual measurement anywhere in the machine?

A. That is true, but the laws of nature, Mr. Ely, cannot be controverted, and if a reading is given by an anemometer averaging up to less than that, the anemometer is absolutely wrong, it cannot help itself.

[fol. 535] Q. You, however, never found a place where the speed of air in the Smith machine was anything like the figure you stated?

A. The reading of my anemometer did not give it.

The Court: How many readings did you make?

The Witness: I made only one, your Honor. You see, I wanted to get some idea of what this Smith machine was

doing. We were consulting over the case. I had no definite data outside of Mr. Taggart's affidavit in the preliminary injunction proceedings, and I wanted to get some figures of my own. These were not James machines. I did not want to disturb Mr. Heisle. I told him what I wanted to use these for, and he consented to my going in, but I had no curtain with the isingglass in. I had to do it quickly and I was a guest and one reading showed me at this point we could not get a velocity at sixty to eighty feet, which I did not see how we could get.

Q. In that theoretic calculation of your, did you make sufficient allowance for loss by friction?

A. Friction does not come into the picture. The volume per minute, divided by area, is velocity, with much friction or less friction. The only difference with friction would be to possibly compress the air one or two per cent. and give a slightly different result.

Q. As a matter of fact, Dr. Greene, is not the type of fan, [fol. 536] which is used by Smith peculiarly susceptible to the friction which may be placed in the path of air delivered therefrom?

A. I should think so.

Q. Now, even your theoretic speed of air—you find points in the James Way incubator in which even that theoretic speed of air is reached, do you not? A. On this chart I find——

Q. You find a number of points?

A. I find marked tray 9, from the bottom, I find a rate indicated of 240 feet per minute.

Q. And what was your theoretical——

A. I have forgotten just what it was. I think it was something like,—I think it was either four hundred or three hundred and twenty.

Q. 260, was it not?

A. Was it? I have forgotten, Mr. Ely.

Q. And you find spots where it even goes up to 340 or 350 feet without any apparent difference to the eggs?

A. I find readings at 340, 350 and 505 near the inlet to the impeller and from what I have heard about the operation of the James machines, I believe these machines work properly at these speeds.

Q. As a matter of fact, you would expect to find variation in the speed of air in the Smith machine at various points, wouldn't you?

A. I would not expect to find much difference in the speed in the different lanes. I would expect to find a lower speed throughout the egg trays, but when you come to the bottom section of the Smith patent where the fabric is placed, I would expect to find a speed of seven or eight hundred feet per minute through that section, which Mr. Smith says must be of high velocity.

[fol. 537] Q. Now, as I understand it, from a consideration of your testimony that was given, you find that in the James Way machine the condition of the air was sub-atmospheric?

A. Yes, sir.

Q. That is, it was low pressure, sub-atmospheric.

A. It was what you might call induced air action.

Q. Inside that casing, the conditions are sub-atmospheric?

A. Within the egg chamber.

Q. In the Smith, it is super-atmospheric, that is, it is higher than the surrounding atmosphere?

A. Yes, sir.

Q. That was the purpose of your making that series of tests with the candle, to show the candle blowing into the James and blowing out with the Smith?

A. That is right.

Q. And that result, within the two machines, was the comparative pressure between the pressure inside the chamber and the pressure outside in the room?

A. The pressure of the atmosphere and the pressure of the chamber.

Q. The pressure of the surrounding atmosphere and the pressure of the chamber?

A. Yes, sir.

Q. Do you know whether that makes any difference to the eggs, whether they are hatched in a sub-atmospheric pressure or in a super-atmospheric pressure?

A. I should think it might make a little difference because of the effect of the pressure of the gases; that is, whenever we have to transmit materials through a septum, the concentration of the materials on the two sides is the thing which affects the flow.

Q. Now, would you say there would be no effect?

[fol. 538] A. I could not say that there would be much, I do not think there is much.

Q. This must have been a matter which you considered of considerable importance, was it not?

A. Oh, yes, quite important.

Q. You considered it quite important?

A. Yes, sir.

Q. As establishing, possibly, some difference in the mode of operation of the machines, and that was the reason you spent so much time on it.

A. More than that. The Smith patent clearly calls for an outlet from the egg chamber into the air. That could not be possible if the egg chamber was sub-atmospheric, that would be an inlet. Therefore, it is quite important to show that in all of the claims here, Mr. Smith has this outlet in his egg chamber which is a thing that does not exist in the James, where the Smith calls for it.

Q. And the fact that the atmosphere in the James Way is sub-atmospheric and in the Smith is super-atmospheric is an important difference in the two machines.

A. That is one of the important differences.

Q. That is why you spent so much time on it?

A. I don't know as we took so much time.

Q. Those readings you took were taken comparing atmospheric pressure inside the chamber with the atmospheric pressure outside in the room, and you measured that with your exhibit here—I do not know what exhibit number this is—in this comparison sheet here you had some thirty points of difference allocated between the two. You found [fol. 539] the sub-atmospheric pressure in the James Way machine was .019 and the super-atmospheric pressure in the Smith was .014?

A. Yes, sir.

Q. That was true?

A. That was the reading determined.

Q. That is Exhibit 52. That is the total difference between the two machines as far as pressure is concerned, was .033, that is thirty-three thousandths of an inch. Now, that is thirty-three thousandths of an inch measured on a column of water which will be supported by the atmospheric pressure, is it not?

A. Yes, that is right.

Q. What is the total column of water which is supported by atmospheric pressure at the level?

A. About thirty-four feet.

Q. About 407 inches, as I recall it?

A. Yes, 408 inches, or 407, yes. 407 or 408—over 400 inches.

Q. That is the normal atmospheric pressure supports a column of about 407 inches of water at sea level and the difference between the atmosphere inside the James and the atmosphere inside the Smith is thirty-three thousandths of one inch?

A. Yes, sir.

Q. Ordinary barometric pressures are measured in inches of mercury, are they not?

A. Usually.

Q. What is the atmospheric pressure of mercury at sea level?

A. In round numbers, thirty inches, twenty-nine and ninety-eight one hundredths.

Q. What is the ratio between mercury readings and water readings?

A. 13.65.

Q. That is one inch of mercury equals 13.65 inches of water?

A. That is it.

[fol. 540] Q. Will you reduce this .033 to mercury, for me?

A. That would be roughly, .002 inches of mercury.

Q. That is about——

A. About two thousandths.

Q. About two thousandths of an inch, roughly. Now, as a matter of fact, there is a variation in the atmospheric pressure right here at Buffalo, any time you want, during the day, much greater than that difference between the Smith and James, is there not?

A. Yes, that is very true, and with it you would get the variation in the cylinder, because these are all relatively atmospheric. If the atmosphere in Buffalo goes down an inch of mercury or two inches, then this pressure in the James goes down the same amount, and it is relative.

Q. And in the Smith the same?

A. Yes, sir.

Q. The pressure goes up and down as the atmospheric pressure goes up and down?

A. Yes, sir.

Q. Will you look at the Buffalo Evening News of yesterday and see what the barometric pressure was at 8 P. M., 8 A. M. and noon?

A. The barometric reading recorded in the Buffalo Evening News for Wednesday, February 7th, this, therefore, would probably be the day before, was 30.24 at 8 P. M.; at 8 A. M. 30.18 and at noon 30.22.

Q. That is, the variation in the atmospheric pressure here in Buffalo yesterday or the day before yesterday was far in excess of the difference in atmospheric pressure inside a Smith and James, it was far in excess of that?

A. There is no atmospheric pressure. You mean chamber pressure?

[fol. 541] Q. Yes.

A. That is correct.

Q. The difference in chamber pressure in the Smith and James was a mere fraction of the difference in Buffalo here in one day?

A. Yes. It makes all the difference in the world, though, whether it is sub or super.

Q. That is to say, the condition of the James in the morning and the condition of the Smith in the afternoon might be the same, as far as pressure in the chamber is concerned?

A. That is correct.

Q. And eggs are only concerned with the pressure of the air immediately around them?

A. I think that is right.

Q. What is the relation of pressure to elevation?

A. I don't know what you mean by that.

Q. Well, as you go up from sea level, your pressure level, your atmospheric pressure will vary, will it not?

A. Yes, sir.

Q. And what is the variation of .033, in feet, how is that represented in elevation?

A. I don't know. I could look it up in some hand book, if you would give me time, but I don't know what it would be.

Q. I wish you would check that for a moment. With this table before you, will you work out the difference in elevation that that thirty-three thousandths of an inch difference in pressure in the Smith and James represents?

A. I am reading from the copy of "fan engineering", by the Buffalo Forge Company, copyrighted 1933, and owned by Mr. R. D. Madison, on Page 22 where I find a table entitled—"altitude density table" and where I find in Column 1, altitude in feet, and I find in the third column, [fol. 542]of groups of three, the barometric reading, I find that the difference for 100 feet is .11 inches of mercury.

Q. Working it out from that, what would be your difference in elevation?

A. Then assuming a difference of zero point zero two inches of mercury, if we divide this by .11 and multiply by 100, we should get the answer which you ask, which is about two feet.

Q. That is, there is a difference in elevation of about two feet which would cover the entire difference in the pressure within the two chambers of the two machines, that is true?

A. Yes, sir.

Q. That is about the height of this table?

A. Yes, sir.

Q. That is, if we put a James machine up as high as this table and the Smith machine rested on the floor, we would have exactly the same pressure condition in the two chambers?

A. That is probably correct.

Q. That is the important difference between the Smith and James Way machines?

A. Yes, it is very important difference because of these two claims. You see, Mr. Smith is the author of the claim——

Q. I am asking you as a practical matter?

A. Yes, as a practical matter it is very important.

Q. If a man had a Smith machine and he wanted to obtain the same results in the James Way machine, all he would have to do would be to jack the machine up two feet?

A. I did not say that.

Q. And you would get the same pressure?

A. Yes, sir.

Q. The eggs would be under the same pressure as they [fol. 543] are in the James Way.

A. Yes, sir.

Q. That is the big difference between the James Way and the Smith?

A. Oh, no, that is not the only difference.

Q. That is an important difference?

A. No, that is not the important difference in those pressures, no, indeed.

Q. That is to say as far as the eggs are concerned if our store-room down there happened to be two feet lower than your store-room where you had your machine you would find the same pressure conditions in the James Way egg chamber in our store-room as the Smith in yours?

A. No, to be also facetious, it would not be the same because the places would be different, but in the same room it might be so.

Q. Now, will you take the Smith patent, please. I wish you would look at the Smith patent a moment, and particularly at the drawings of the patent. While you were talking about the matter of the circulation of air in the Smith machine, you called the Court's attention to Fig. 1, didn't you?

A. I suppose I did. I used both figures.

Q. In that figure there is one opening 28 shown at the top of the column, is there not, on Fig. 3, and——

Q. Fig. 1, I am talking about.

A. I beg your pardon, in Fig. 1 there is one 28 at the top of each of the egg columns.

Q. That looks as though the air that came up through the column, might all go out through the opening 28, looking at that one figure, there might be some basis for that.

A. Yes, if there is only one in that whole chamber.

[fol. 544] Q. If you turn over to the other figure, you will find there is only one opening in the whole length of the machine.

A. Over each egg chamber, that is correct.

Q. There is only one opening?

A. Yes, sir.

Q. You recall the testimony of Mr. Taggart, and I think I said in some of my remarks, only one per cent. or one-half of one per cent. of the air which was circulating in that chamber passed out of the opening. What becomes of the remaining 99 per cent. of the air?

A. It was recirculated.

Q. How is it recirculated?

A. It is drawn in from the egg chamber; looking at Fig. 1, I think that is the best; it is drawn in from the top of the egg chamber in the space above partition 22 and enters the fan chamber on the suction side 21.

Q. Then what happens; what happens to that 99 per cent.?

A. Then the 99 per cent. is met with one per cent. of cold air, entering through the restricted entrance, not the restricted exit, but the restricted entrance, and it is then warmed, if necessary, in the coils 23, because coils 23 are only warming coils.

Q. It passes the coil 23 before it gets in the fresh air, or about the same time?

A. Not necessarily, the fresh air will be sucked in, and just how the streams are flowing in there, I do not know, it may be all the recirculating air is heated up and given that extra heat up to the cold air, in any case it is well churned. Then, if we look at Fig. 3 again, we will see at the right-hand side the steam pipe 26 which introduces into this air——

[fol. 545] The Court: 26 in Fig. 1?

The Witness: No, your Honor.

The Court: That is the wrong one.

The Witness: Yes. I should say that would be the return air. Steam is introduced so you have a mixture of steam, fresh air and return air 99 per cent., one per cent. of fresh air and a little steam churned together, and delivered by the fan 18 into the corridor below.

Q. That is to say, the 99 per cent. of the air which comes up through the egg column passes over the beam, through the fan and back down through the corridor?

A. That is right.

Q. Then it goes into the column and starts another cycle?

A. That is correct.

Q. And you are taking off all the time only one per cent. of the air?

A. That is correct.

Q. For instance, if you have a stream of water and you are taking a little water off for the mill race, but the big volume is going on down the stream——

A. That is right.

Q. In the same way you are shunting one per cent. of that volume out through opening 28?

A. Yes, sir.

Q. And the remaining 99 per cent. is going around in a circle?

A. That is correct.

Q. And the air, as it comes up over the top of those beams will carry with it any heat, will it not, it will carry heat with it?

A. The heat which it has, it will carry with it.

Q. And it will carry that heat with it, modified by one per cent. of cold air and whatever steam comes in, it will [fol. 546] carry that heat to the bottom and start on recirculation?

A. The one per cent. I have figured in the Smith machine per one thousand eggs, averaging it as Mr. Taggart said it should be averaged, although only one per cent., amounts to 900 British Thermal units per day per thousand eggs and the moisture means 2540, and although only one per cent., it represents almost 100 per cent. of the biologic heat which is generated by the eggs.

Q. I understand your argument and you see what I am driving at, but just the same I wish you would answer my questions and not argue the case. Dr. Greene, that 99 per cent. of the air that comes up over those columns carries the heat that happens to be at the top to the bottom, carries that around to the bottom?

A. That is correct.

Q. Now, suppose we put, as the Court asked the other day, suppose we put the hot eggs at the top of the column in the Smith machine and that air is going over those eggs, and 99 per cent. of it is going over those beams, and back down to the bottom, why will not the heat be carried from those hot eggs around in the circuit?

A. What was your question?

Q. Why will not the heat under those conditions be carried around the circuit?

A. Because one per cent. of that heat, your Honor, which in this case no more than one per cent. of this heat, your Honor, would be equal to the heat removed by this waste air, no matter where it goes or how it goes out, and must be replaced by steam heat on the other side.

Q. But 99 per cent. of the air is sweeping over the eggs and sweeping over the beams and going back down the [fol. 547] corridor, is it not?

A. Yes, sir.

Q. And carrying that heat with it which it got from those eggs?

A. If it is not carried out by the cold pipe which you use in the Smith machine, when it gets too hot.

Q. There is no cooling pipe in the Smith patent?

A. No, that is not the arrangement, as stated in the Smith patent either. It is very clear the Smith patent can only be for a machine as described in the patent to get what he calls for.

Q. That is what I am talking to you about and exactly what I am getting at, Dr. Greene. 99 per cent. of the air comes sweeping up over that column and sweeping over the eggs, carrying the heat to the bottom?

A. No, it may have given it up to the eggs.

Q. I am assuming it is the hot eggs, and I am talking about the assumption in the Smith patent, that in a structure like that we will put the hot eggs at the top. If we did that, the heat from those hot eggs would be carried in the 99 per cent. stream around to the bottom; you agree with me on that, do you not?

A. That is correct.

Q. That heat from the eggs is not going to all take to and run out through that opening?

A. No.

Q. It is going into the stream and go around?

A. The 99 per cent. of the air will, but the one per cent. that goes out will carry with it the heat from the eggs.

Q. I will let you talk about that after awhile. If we put the cold eggs in at the bottom of the column, those cold [fol. 548] eggs would receive the heat which came from the hot eggs at the top?

A. No.

Q. Let us go over that a moment. You said the heat from the hot eggs at the top of the column would be carried by the 99 per cent. of the air in circulation down through the corridor, did you not?

A. If I said that, that is a misstatement.

Q. What would become of that heat?

A. The heat from the eggs, take it by and large, which Mr. Taggart wishes us to, which is I think correct, the largest part of that goes out. The 99 per cent. of the heat in the air, which is the result of a large quantity of air being carried around is carried over, but 99 per cent. of the heat of the eggs is not carried back.

Q. Let us go over that again. If your air column comes up through eggs, and 99 per cent. of that air goes over the beams, one per cent. only goes out the opening?

A. Correct.

Q. That 99 per cent. will carry with it whatever heat conditions there might be in the eggs it passes over last, is that not so?

A. No.

Q. Will not the heat at the top of the column, if those are hot eggs at the top of the column, will not that heat be imparted to the air stream as it passes over them?

A. It will be added to it.

Q. And it will be swept with that air column over the beams?

A. 99 per cent. of the air with its heat goes over the beams. That heat is not the result of the egg heat alone, it is the net effect of egg heat and air heat when it first struck the column.

Q. I understand that, but the heat of the eggs that are [fol. 549] in the top of the column, having imparted heat to that air, whether that is all the heat or not, I am not asking you, but they have imparted heat to that air, you understand.

A. Yes, that is true.

Q. Then, that heat is carried in that air down through the corridor?

A. It is not.

Q. What becomes of it?

A. It runs out through the atmosphere for about 95 or 98 per cent. of it goes out through 28, when we consider it as a uniform amount.

Q. This heat I am talking about has continued past the beams in the meantime?

A. But Mr. Taggart properly said we would not tag each British Thermal unit, we could not, and when using that method, 99 per cent. of the air goes around, that is correct, and the heat which goes out, goes out but the heat which goth out through 28 is the heat put in by the eggs and therefore, using Mr. Taggart's theory, that heat does not go around.

Q. You are assuming all the heat that came in from the eggs at the top of the column went out at the top through 28?

A. I am assuming all the heat, if we do not tag individual heat units, goes out at the top.

Q. That heat of the eggs which are up at the top will go out through 28 notwithstanding 99 per cent. of the air

goes up over the beams and around to the bottom, that is your testimony?

A. Yes, sir.

Q. So that heat from the eggs all runs over to 28 and goes out?

A. I am trying to use Mr. Taggart's method.

Q. I am asking you to give me a fair answer to my [fol. 550] question?

A. I am answering your question. Without ...gging a particular British Thermal unit, which comes out into the stream, that heat unit would get back, but treating it as a general proposition and taking it in total, the heat leaving then is put in by the eggs.

Q. What you are saying is that more heat goes out through those openings than is put in by the eggs?

A. Yes, sir.

Q. Heat is supplied by two sources, one hot air or hot water pipe——

A. Yes, sir.

Q. And the other by the eggs in the later stages of incubation?

A. Yes, sir.

Q. That is where you get your two sources of heat?

A. Yes, sir.

Q. You cannot pick out and divide one heat unit which comes from the eggs and one from the pipe?

A. I do not think you can.

Q. You cannot say that a heat unit which comes from the eggs goes out through opening 28?

A. Some heat units do.

Q. That is to say, if you did not have the heat units given up by the eggs in the later stages of incubation, you would have to add that much more heat to the water pipe and heat enters through these two sources, and no particular individual heat goes out that opening?

A. Yes.

Q. Although it may be more heat than given up by the eggs?

A. Yes.

Q. And then following that conclusion, the heat will be carried from the eggs at the top of the column, if those are hot eggs, down into the stream, going down the corridor, and down to the lowermost trays, is that not so?

A. For a particular egg, yes, but for the body as a whole, no, it could not be so.

[fol. 551] Q. And if we have 1,000 eggs in there, the heat from a certain proportion of those thousand eggs will go up over the beams and down the corridor?

A. If we tag the British Thermal unit, yes, but some of the others tagged will go out.

Q. Then, is it not a fact that if you put hot eggs at the top of the column in the Smith machine and cold eggs at the bottom, then the cold eggs at the bottom would receive heat units carried by the current down to them?

A. If you take the individual heat units, that is true.

Q. In any event that is true, whether you take the individual heat units or not?

A. It is not true in any event.

Q. Now, one per cent. of the air only has gone out of that opening and 99 per cent. of the air has swept over all those hot eggs and come into the corridor and come down into the cold eggs; you say that current carries no heat unit from the hot eggs at the top to the cold eggs at the bottom?

A. You say "in any event". I know and I have found where it does not happen.

Q. It may happen?

A. It may not happen in the conditions you say, but in the conditions I know of, it would not happen.

The Court: He is saying the heat.

The Witness: I am saying the heat goes out of 28.

The Court: You could not distinguish the heat from the eggs and heat from other sources, as they go over the eggs they are mixed together.

[fol. 552] A. If you do not take it, treat it as a whole. There is more heat leaves than the eggs give off.

The Court: His question was not directed to the heat degree, his question is whether there is a certain amount of that heat carried down to the lower column.

A. If we tag a British Thermal unit, there is.

Q. And you cannot tag a British Thermal unit?

A. No, sir.

Q. Nevertheless, that thing takes place?

A. Under certain conditions, I think it does.

Q. I am asking in the Smith machine, that will happen, will it not?

A. If the hot eggs are at the top and the cold eggs at the bottom some of the heat delivered by the hot eggs may get down to the cold eggs.

Q. Will get down?

A. Will get down if we do not separate it in this peculiarly hypothetical method I have used.

Q. Which is impossible to use?

A. Yes, sir.

Q. Then, would you say in that reversed arrangement of eggs in the Smith machine we have been talking about, the units of heat would be carried from the eggs in the later stage of incubation to the eggs in the earlier stage?

A. I think you could use that expression for part of the eggs.

Q. That is, for part of the eggs?

A. Not all of them.

Q. That is due to the fact that the air is cycling in recycling currents with only one per cent. going out in one complete cycle, is it not?

[fol. 553] A. This assumption, which you are making, would be true if there were only 30 per cent. recirculated, that is the highly hypothetical condition which is entirely different from that used by Mr. Taggart and which I think is the right one, which clearly indicates the heat is not sent back in any amount.

Q. Where you recirculate and so-call tag your heat unit, it does get around?

A. It is common sense.

Q. It is common sense to say it gets around whether you tag your heat units; it is common sense if your air is moving in a closed cycle, you will carry heat from the eggs in the later stages of incubation to the earlier stages, whatever the arrangement?

A. If you use a closed circuit, it is true.

Q. And Smith is a closed circuit?

A. Smith is not a closed circuit.

Q. Well, 99 per cent. goes around and one per cent. goes out?

A. And one per cent. takes out more heat than is put in.

Q. And you have to have a certain amount of foul air taken out and a certain amount taken in?

A. Yes, sir.

Q. And you also know, do you not, that you cannot carry on incubation without a certain percentage of fresh air going into the machine and a certain percentage coming out; in other words, you cannot have a one hundred per cent. closed circuit in an incubator?

A. That is very true.

Q. And you have in the Smith machine, in practical working, a 99 per cent. closed circuit?

A. Yes.

[fol. 554] Q. And that 99 per cent. closed circuit is going to carry the heat units from the eggs in the later stages of incubation to the eggs in the earlier stages, by that arrangement?

A. The 99 per cent. arrangement you speak of is in error, I would rather call it a 105 per cent circulation of air. The closed circuit is a closed air circuit, not a closed heat circuit, and what you say is a closed heat circuit is almost entirely open.

Q. And a closed circuit carries the air?

A. Yes, sir.

Q. Do you agree with this statement, "But, when as in Smith, the air moves in cycles through the corridor and tiers, it makes no difference after the first cycle which way it moves through the egg trays, whether from bottom to top or from top to bottom or whether it first strikes warm eggs, or first strikes cool eggs, for in every cycle after the first, the current when passing warm eggs will gather up their heat units and carry them to the cool eggs precisely as claimed and, in the same way, produce that uniformity of temperature which is the thing sought by the art and achieved by the invention." Look at that statement of Judge Woolley's in the Hillpot case and see if you agree with that?

A. I do not agree with this statement because the cycles are not closed cycles as Judge Woolley was convinced was probably the arrangement.

Q. You are right and Judge Woolley was wrong?

A. Yes, because the Judge did not realize practically more heat went out with this one per cent. of air.

[fol. 555] Q. I understand your argument perfectly, you need not go into that for my benefit, or perhaps for the Court.

The Court: No, he has been over it several times.

Q. Do you agree with this statement in that opinion? This is the statement of the per curiam decision of the Court of Appeals of the Sixth Circuit in the Blum case. In that opinion the subject of the Petersime case was discussed and it is said, "Some acceptance was given to the theory that there is no infringement, unless the circulating air strikes first those eggs which are in the last stages of incubation and are generating the greatest heat. In considering a construction where the main current of air is brought in from outside, and in thinking of only the first circuit which this air makes, that thought seems applicable.

"Counsel now point out with much force, that in a case where the air does not come in from the outside in large volume, and that in any case during the circuits after the first one, no one point in the circuit gets the air ahead of any other point, in an absolute way. Which point gets it first depends upon where we consider the circuit to begin. We think we need not consider the effect of this defect in the reasoning—if it is a defect—of our former opinion.

Do you agree with that statement that there may have been a defect in the reasoning of the Sixth Circuit in their Petersime case?

[fol. 556] A. I believe, if I get your question, that not only does it depend on where you start, if you have a circuit from which you remove air and heat, you cannot say that the heat is returned unless you put your hottest eggs at the bottom.

Q. That is, unless you have a 100 per cent, enclosed circuit or a 100 per cent. closed circuit, you say you have to have a 100 per cent. closed circuit?

A. You could not say that because you have always a heat loss from the walls, which I have not considered in this discussion, which would make it worse. You could not say that in any case.

Q. You said awhile ago the heat would be carried by 99 per cent. of the air from the hot eggs to the cold eggs if the order was reversed?

A. Some heat will, not the heat——

Q. Now, you think possibly the Court of Appeals of the Sixth Circuit was wrong when it said that might have been a defect, you think they were right in the first place?

A. I cannot just quite see what they are getting at, sir.

Q. Assume, for a moment, that the Court of Appeals held in the Petersime case, which came before the Blum case, and before the Hillpot case, that the air which left the fans had to strike the hot eggs first, and assuming that Counsel for the Smith patent in the Blum case, called attention to this closed cycle of air, and the Court of Appeals of the Sixth Circuit said, "Considering the defect in our former reasoning, if it be a defect", you think the Court of Appeals was right in the Petersime case and should not have backed up in the Blum case?

A. Yes.

[fol. 557] Q. That is the history, so that you may know. You think the Court of Appeals was right in the Petersime case and wrong in the later Blum case?

A. Yes.

Q. And you think Judge Woolley was wrong in the Hillpot case?

A. I do.

(Recess until 2 P. M.)

Q. Dr. Greene, I wish you would look at Plaintiff's Exhibit No. 27, and particularly those two arrangements shown in the top row over the heating arrangement of Boling- Jensma at the end of the hatch, and arrangement of Boling-Jensma one day later. Just look at that for a moment.

Now, in that arrangement, you observe that the air—assuming that this is a correct illustration of the principle of the Boling machine—you note that the air goes up from the fan and then down through the egg column; that is correct, is it not?

A. I notice the curve of the arrow—a curved line represent- motion of air which goes up on one side, where there are no eggs, and down on the other side.

Q. And you note that in that case, the air, as it comes from the fan, will strike first the cold eggs and then move to the hot eggs?

A. I note that that air which does not go out of the vent at the top will come around and bathe the cold eggs and then the hot eggs.

Q. And then, from the hot eggs go back through the fan and then back again to the cold eggs, minus the small [fol. 558] amount that goes out of the opening?

A. Yes, and plus the amount which comes in at the bottom below there, yes, sir.

Q. Now, in that case, then, the air in its cycle, disregarding that small interchange, the air in its cycle strikes first the cold eggs, then goes to the hot eggs, then to the fan and back to the cold eggs?

A. If you neglect that quantity that is there.

Q. Yes, overlooking that small percentage that passes out of the opening.

A. That is a small percentage of air but not a small percentage of heat.

Q. Yes, I understand. Now, do you agree, then, assuming that that is a correct construction of the Boling machine, that that operation is substantially identical with the Smith incubator and its process of operation is the same, as they both contain a process of setting of eggs in various stages of incubation in a forced, fan impelled draft of air in repeated circulation of the same body of air within the incubator in continuous repeated cycles through the mass of eggs so that the air taking up a full complement of moisture a premature drying of the eggs is prevented?

A. I don't agree with that.

Q. You do not agree, then, with Judge Cavanah in his decision in the Jensma case in Idaho?

A. I think I have explained my reason for the difference.

Q. Yes, I think so. I just wanted to see if I could find some case in which you were in agreement, some recent case in which you were in agreement. You also disagree, assuming that this next group is a correct representation [fol. 559] of the arrangement of eggs in the Robbins machine which was involved in the Waxham case?

A. I believe that is a possible arrangement of eggs in the Robbins machine.

Q. That is, we have the eggs all sandwiched in, with different endothermic and exothermic eggs sandwiched through the machine?

A. Yes, sir.

Q. And we have a continuous cycling movement through those eggs and through the fan.

A. We have a continuous movement but not a complete cycle because of the small quantity of air let out and let in, and the large quantity of heat let out and let in.

Q. Do you agree with this statement of the Master in that case, finding infringement of the Smith Patent:

"If we disregard the small amount of air that is constantly changing through the restricted opening, the air is circulated in closed cycles, and the order in which the eggs are arranged does not seem to affect the process, so long as the eggs are arranged at different levels so that the circulating air may reach all of them?"

A. I do not agree with the statement completely as given here, because it is true that he is disregarding a small amount of air, but I do not believe the Master could have considered the large amount of heat which is associated with that; and, therefore, I differ.

Q. That is your same point that you sought to make this morning?

A. Yes.

[fol. 560] Q. Now, will you look at that next group, the Snow showing. That is practically the same as Robbins, is it not?

A. Yes, it is.

Q. Do you agree with this statement of Judge Molyneaux,

"Claims 1 and 2 of the patent are not limited in their terms or by the proceedings in the Patent Office to the setting of the eggs which are in various stages of incubation in any order or sequence, nor to the shifting of eggs during the process but on the contrary are of sufficient breadth to cover any arrangement of eggs in various stages of incubation?"

A. I do not agree with that statement.

Q. You are out of step with these later decisions on the Smith Patent, then?

A. Those that you have read, I differ with.

Q. Now, suppose, for example, we did not let as much heat out through the openings, through the vent openings, as was given off by the eggs; in other words, not as much heat escaped through the openings as was given up by the eggs or by other sources, what then would happen?

A. The heat, of course, would rise, and you would soon get a condition which, from all that I have read, would prevent proper incubation.

Q. Now, with regard to the James Way machine, do we have in the James Way machine the air circulating in repeated cycles through the machine?

A. We do not.

Q. I will go to that point a little later. Now, in the James Way machine, as I understand it, you can set the eggs in [fol. 561] any order in the egg chamber, and it makes no difference, in regard to the process?

A. That is correct.

Q. And as one of those, perhaps, thousand arrangements, you might arrange the eggs with the eggs in their inverse order of their age, or in the exact order of their age, from top to bottom, might you not?

A. I think you might, yes, sir.

Q. And you would still get the—that would not affect the operation of the James Way machine?

A. I don't think it would.

Q. And you might even set them in there one day, and come back with your next setting and rearrange the eggs, if you wanted to; that would still make no difference in the James Way operation.

A. I don't just understand the statement.

Q. You might shift the position of the eggs; in other words, if you moved the position of the egg trays during the period that they are in there, it still would not make any difference in the operation of the James Way machine?

A. I think the machine would operate, yes.

Q. Now, coming back for a moment to that matter of the possible recycling of air in the James Way machine, do I understand you to say that you do not think that is true—I mean, that is your position?

A. That is my position.

Q. Now, when you were calculating the amount of air that left the James Way machine, how were you figuring that?

A. I figured that by actually measuring the air leaving the machine by a small anemometer, and the amount which I obtained was 746 cubic feet per hour for the whole machine, which had 4,200 eggs in it, which gave me 177 cubic [fol. 562] feet of fresh air per hour per thousand.

Q. Now, what speed did you find the air was coming out of those openings?

A. I got two different readings. In one of them, the quantity was 727 feet per minute, and in the other one it was 412 feet per minute, and I averaged those two.

Q. And you found that, I take it, by some calculation with respect to the area of the openings and the speed at which the air was going through?

A. Yes, sir.

Q. That is, you used the four openings and the speed of the air going through, is that right?

A. Yes, a small anemometer, and the speed coming out; then, took into account the size of the opening, which was one inch in diameter.

Q. And by that process you arrived at the amount of speed of the air going through, is that right?

A. Yes, a small anemometer, and the speed coming out; then, took into account the size of the opening, which was one inch in diameter.

Q. And by that process you arrived at the amount of air which was coming out, say, in a minute.

A. Yes.

Q. Did you make that calculation on all four openings?

A. I have got the left and the right holes, using two different anemometers and checking them. I used the right hole there because it was small, and then I put a cone over the two holes and measured it, and I worked on that one side, as I recall it now.

Q. In figuring the amount of air which left the machine, you made your calculation with all four holes open, did you not?

A. Yes, sir. I have the left small integrated reading and the right small. Now, as I remember them, we worked on the two—you know, there are four holes right and left.

Q. Yes.

A. And I think I integrated, as I have it here, over the left small and right small.

[fol. 563] Q. You remember when we were down at the warehouse here, the other day, and you were demonstrating the machine to his Honor?

A. Yes.

Q. There all four holes were open?

A. Yes.

Q. And you remember there was a general chorus from the James Way people that that was the way the machine was operated normally?

A. When filled with eggs.

Q. And that is the reason you made your calculation with all four holes open?

A. Yes, sir.

Q. Do you not know, as a matter of fact, in normal operation of the James Way machine, only two of those holes are open?

A. I don't know that. As I understand it, they close down as the number decreases.

Q. Now, if the normal operation of the James Way machine was with only two holes open, you would have to make a considerable change in your calculations there, would you not?

A. You might; the holes on one side usually give less, as my results show, than the other, and it depends on which of the two holes you would close. In one case you would take over half of that, in the other case you would take less than half.

Q. You notice, when we were down at the machine the other day, that the air was going into one of the holes, was it not?

A. Not continuously. The smoke, if you would notice that, was coming out of all of them, but at one of those holes there was suction in and a puff out, but at a short distance away from it, where you could get rid of the effect of the impeller passing and got a steadier mean flow, you found [fol. 564] that there was a blow out. That is the way I observed it. I was not right up beside it.

Q. That is to say, as I understand your testimony, you said there was fluctuation of air going in and coming out, and going in and coming out, through those holes?

A. As shown by the candle, you could see it go in and you could see it come out, but as soon as the candle was taken out about six inches, as I recall it, there seemed to be a steady stream out. That was my observation.

Q. And you said, from that, and you drew your conclusions from that, that fluctuations at openings indicated to you there was fluctuations of air through the whole machine?

A. I said it might be possible because at that one hole there was that fluctuation, and the impeller is not in the proper form of casing. There are partitions, there are pipes, and also the air is being discharged out in all directions around the sides, so that I think there is, possibly, at

that speed the oscillation and the pulsation which you saw.

Q. That is to say, part of the time the air is going in and part of the time it is coming out?

A. At that place, through part of the opening; that is, it was down at the bottom if you recall that, you got it going out, and as you put it up towards the top it seems to come out all the time.

Q. And the fact that the air was fluctuating in and out through those openings would reduce the total amount of air that was coming in—or was coming out, rather, during one minute?

A. If you took it instantaneously, yes, but if you took it over a minute, the results you got over a minute would be [fol. 565] the net amount.

Q. That is to say, as air was coming in and going out, there was not a constant flow out of the hole, constant outflow of air out of that hole?

A. The outflow was not uniform. It was a pulsing flow. The net result during a minute, though, would be an outward effect.

Q. Now, if, as shown in the testimony here yesterday, the normal operation of the machine is with only two holes open, you would have to divide your amount of air outlets by two, would you not?

A. Not by two.

Q. You would have to take half of that?

A. You might divide it by more than two or less than two. It would have to be reduced, though.

Q. In other words, that amount of air flow or amount of air interchange in the James Way machine is not a fixed thing in the operation of the machine?

A. It depends. It is not fixed because it depends upon the openings which are open.

Q. And the man can adjust that as he finds operations may require?

A. Yes, sir.

Q. And the fact that he has got four openings would indicate to you, would it not, that the four openings was the maximum amount which might be required without some special conditions?

A. No. I have made calculations on this machine, and I find that, in order to keep the carbon dioxide constant in that machine, carrying the number of eggs which it does,

it should have 1,000 cu. ft. passing per hour, as the machine which I tested was not discharging that much. The design of the machine and the theory underlying the holes, as I [fol. 566] understand it from the engineers, is to maintain a definite CO2 content of 16 parts in 10,000 and if you figure that in the results of the West Virginia experiment station, it comes out that there should be 1,000 feet per hour passing through the machine, and that was what fixed these sizes, as I understand it.

Q. You recognize the fact, do you not, that the adjustment of those openings is determined by the weather conditions outside, in a large measure, and those openings are adjusted to take care of different weather conditions?

A. They take care of weather conditions provided the pan is not sufficiently large; as I understand it, from the testimony which I have heard.

Q. As a matter of fact, those openings are adjusted so as to get the amount of air outlet to compensate for difference in weather conditions, is that not so?

A. No, sir.

Q. You do not understand that to be so?

A. Not completely, no.

Q. If there is any contrary statement in the book of instructions here, you would have to yield to that, would you not?

A. No, I wouldn't.

Q. That is to say, the amount of air which is taken out is variable and the same thing is true in the Smith incubator, is it not?

A. That is true.

Q. And you may throttle down that amount in both the James Way and the Smith, as far as you like?

A. I have never seen a Smith machine operating with no air circulation. When I visited the plant at Frenchtown, I couldn't get any reading on my anemometer on the air [fol. 567] inlet, and I presumed that, at that time, they had cut off all air in order to raise the humidity, and in that machine I do know you can close them off completely, you can close off the holes, but I have never seen it done.

Q. And you have a range of intermediate positions, according to what conditions may be, for successful incubation, is that not right?

A. In the machine inside, taking all the elements, yes, sir.

Q. That is to say, your calculations were made of this

amount of air interchange with the maximum holes open all the way, I think you said; that is true?

A. Yes, sir.

Q. Now, let us take a look at the drawing of the James Way machine. Now, in the first place Dr. Greeene, this drawing of the defendants' machine, introduced by the defendants, Defendants' Exhibit No. 33 is not accurate, is it, in certain particulars?

A. I do not know in what particulars it is inaccurate, but it is made to illustrate the way in which the device operates.

Q. Now, one of the inaccuracies to which I refer is the fact that it shows the upper, what we call fan housing against the lower board, is that not right?

A. Yes, that is correct; that is in this picture. This is not the one that was issued. If you will get the one submitted to the Court which was not colored, I think you will find some differences.

Q. But that is shown correctly in the plaintiff's drawing?

A. May I point out that the Counsel presented to me a colored picture which is not quite the same as this one, Exhibit 33.

Q. But the plaintiff's drawing is accurate, is it not in [fol. 568] that respect?

A. The plaintiff's drawing shows, without cross-hatching, because the suction is taken directly through the middle at this point, a return duct above the impeller and the entrance, and diagrammatically, I think that is correct.

Q. And that is true of both of these views of Plaintiff's Exhibit No. 14?

A. Yes, sir, that is correct.

Q. Then, let us look at those for a moment. Now, this thing that we have denominated a fan up here, that we have called a fan, which you say is not a fan, throws the air out into the space formed by the upper and lower housing, as we have called it?

A. That is correct.

Q. That is true, is it not?

A. Yes, sir.

Q. And a certain proportion of that air goes out of the outlet opening in the upper left hand corner?

A. On Exhibit 14, that is correct.

Q. And the main body of air goes down through the channels in the front and rear?

A. Yes, sir.

Q. And then, when that body of air comes down, it is discharged at the bottom of the cabinet, and then it comes up again through the egg chamber, does it not?

A. It comes up through the egg chamber after being mixed by the mixer, and mixed with fresh cold air which comes in.

Q. But with the addition of increment of cold air, that air continues up around through the egg chamber, does it not?

A. That air which is left continues up around the egg chamber.

Q. And then it is again picked up by this fan and carried down through the same cycle?

A. That is correct.

[fol. 569] Q. And then, except for the small amount of air, or except for the amount of air—I will cut out the word "small" in deference to you—except for the amount of air which passes out of the outlet opening, and the amount which comes in at the base of the machine, that body of air is moving in a closed cycle?

A. The body of air has one other element to it, which you have omitted, namely, the humidifying pan which absorbs, from the active heat of the air, a large quantity of heat much more than the eggs in this incubator, which does not have a hatching section, and, therefore, eliminates 64 or 70 percent of the total heat passing through.

Q. Yes, but you are now arguing the case, Dr. Greene.

A. I am telling the facts.

Q. I asked you simply whether the body of air, except for that portion that goes out through the outlet opening and comes in through the inlet opening, that body of air goes around in a closed cycle?

A. That is correct.

Q. Now, I understand then, that the James Way incubator will operate in the same way, whatever be the order of arrangement of eggs; that is true, is it not?

A. I believe that is correct.

Q. And that includes what we have chosen to call sandwiching of the eggs?

A. Yes, sir.

Q. Now, does not a certain amount of heat interchange take place in the chamber between the hot and the cold eggs that are sandwiched in there?

A. Oh, yes, certainly.

Q. And is not the body of heat that is imparted to the air carried around with the same distinction that you have [fol. 570] made with regard to the Smith patent: is not that body of heat carried around through the channels and back up through the egg chamber?

A. No, because of the heat which is removed through the orifice and the heat which is removed by the water pan.

Q. In other words, that is exactly the same thing that you said with regard to the Smith patent?

A. Yes, except one thing in the Smith patent: the hottest eggs being at the bottom of the current carried through the egg chamber, what Smith says is done, can be done. It is the only way in which it can be done.

Q. You are now referring to the detailed description in the specification of the Smith patent?

A. Yes, sir.

Q. You are not, in that respect, referring to the words of the claims. You are referring to the detailed description in the specification?

A. I am referring to the claims, because the claims are met, and we understand them, by looking at the specifications.

Q. Yes, I understand your argument perfectly. I understand what you are driving at.

By the Court:

Q. What is the effect of there being no outlet on the opposite side? The current goes both ways. Your outlet is on one side. What is the effect of the fact that there is no opening on the other side, on the circulation, I mean?

A. The only thing is, your Honor, that the air on the side on which there is no outlet would probably move in the channel of lower velocity because there is a smaller quan- [fol. 571] tity. If the resistance to each one of those channels is the same, and the resistance through the channel is the same, and on one of the channels we have assembled one, or two or three per cent of the air, then, not having as much air to pass through there, the velocity would be slightly reduced.

Q. How would it affect the temperature of the air?

A. I think, your Honor, that it would not affect the temperature because the mixing has taken place before you reach that opening. The churning in there over the water column should mix it up fairly well.

Now, I do believe that, possibly, the air passing down one side of the channel might be more humid than that near the center, and that is the purpose of the stirrer below, to take the air as it comes down through those channels, and, because the water pan does not extend completely across the machine, but is only on each side of the impeller, you would get possibly a laned flow. By "laned flow", I mean flow in which certain of the air would be more moist, or hotter, or contain more fresh air than another part.

Q. Would there be any difference in velocity or speed of the air?

A. No. It is temperature and humidity of the air I am referring to now.

Q. I say, would it affect the velocity?

A. It would only pull the velocity down on the front side because you are handling less air through those channels.

By Mr. Ely:

Q. Now, that air, as it comes down through those chan- [fol. 572] nels in the front and back of the James Way machine, is that hot or cold air?

A. That is hot air, because it has just passed over the heating coils.

Q. Then, as I understand it, James passes a current of hot air down through those channels?

A. Yes, sir.

Q. Down to the bottom of the egg chamber?

A. Yes, sir.

Q. Now, are we not agreed, Dr. George, as to what function that so-called air mixer performs? Are we not substantially in agreement?

A. I think we are. I think you have admitted very nicely at the start that it was for the purpose——

Q. That is, there is no argument between us?

A. No, not at all.

Q. And the purpose of that mixer, and its function—whether it is the reason for putting in there or not—at any

rate, its function is to smooth out the air currents as they go up through the egg column?

A. Well, it is for the purpose of taking the air which comes down the side—although you are in agreement, I would just like to state it this way—the two currents of air from the front and back which, because of coming from a small section of passage must be moving at a higher velocity than the air in the egg chamber, it is to take those two streams which are coming in from each side, the four streams that are coming in from each side, the four streams that are coming up from the bottom, and destroy any high velocity which it must have to come down through that passage, so that when you go up through the machine you have that advance, such as Mr. Taggart has shown on his test.

[fol. 573] Q. That is to say, if you do not have that so-called air mixer in there, the air currents, as you come down through those channels would sweep over to the center and concentrate at the center?

A. That is my belief, yes.

Q. Now, by putting that co-called air mixer in there, you broke up that tendency for the current to mass in the center, and you spread it out and distributed it more evenly over the whole column?

A. Yes, sir.

Q. And as an additional function, that air mixer takes the cold air that is coming in through those holes and distributes that into the column of air, is that not true?

A. That is correct; that is my understanding.

Q. And the practical effect of that air mixer is not felt in the machine above and about the second or third tray; is that not so?

A. As shown by Mr. Taggart's readings, that is so.

Q. And you do not disagree with that?

A. No, I do not disagree.

Q. Now, in the Smith machine, the cold air enters above the fan, does it not?

A. It does.

Q. It is drawn into the fan?

A. Yes, sir.

Q. And the fan mixes that cold air in the stream of hot air and distributes it through the stream of hot air that is coming in over the beams, is that not true?

A. That is correct.

Q. And you, therefore, get that same distribution of cold air evenly through the stream of hot air by the fan in Smith that you get by the air mixer in the James Way?

A. As far as the——

Q. As far as distribution of the cold air is concerned?

A. As far as distribution of the cold air in the mass of hot air is concerned, yes.

[fol. 574] Q. All right; I will go on to the next one in a minute.

Now, you say that, in addition to that, that stirrer tends to distribute the current more evenly throughout the whole column; that is true, is it not?

A. That is correct, yes, sir.

Q. Now, in the Smith fans which are at the top of the corridor, we are going to find immediately below the fans a turbulent mass of air, are we not? A. We are going to determine a high velocity, moving, turbulent stream of air.

Q. And as you go down in the column that air tends to widen out, does it not?

A. It does.

Q. In the column?

A. Yes, sir.

Q. And, therefore, the speed of the air gets more uniform as it goes down in the column?

A. It gets much less, and the uniformity would be determined by taking readings. I have not done that.

Q. You would assume the fact——

A. It would get less, I will say that.

Q. And it would get more uniform, you would suppose, due to the fact that it is spread out over a great area?

A. I am not sure of the uniformity, without taking readings. It would get less, I would say.

Q. You have not any reason for disputing what I have said?

A. I can't say what you have said is right unless I have made a test.

Q. Nor what I have said is wrong; you cannot say it is wrong.

A. I can't say it is wrong nor can I say it is right.

Q. And in the operation of this James Way machine, so far as the transfer of any heat units by the air as it finishes [fol. 575] its cycle, that is, in the back part of its cycle, as

we might call it, that is, in that portion of the cycle going down from the corridors, your position with respect to the James Way machine, as to whether any heat is transferred from the eggs in the later stage of incubation is the same as your position with respect to the Smith machine?

A. No, not quite, because in the Smith machine I cannot deny—in fact, I assert that eggs in the late stages of incubation are giving heat to the eggs of the early, because that heat goes right through the mass. Now, I can't say that with regard to James.

Q. That is, if any heat units are picked up from the hot eggs in the James machine, and go on up into the fan—the thing I call a fan—those heat units, in your opinion, will be dissipated in the moisture pan, is that right?

A. Moisture, and lost through the outlet.

Q. That is, you have to assume, then, that all of the heat units and all of the air flows over the moisture pan, or else flows out of the openings, in order to reach that conclusion, have you not?

A. When you have, as in the James machine, the mixer at the bottom, which thoroughly mixes the air, any heat which you remove by any means whatsoever is going to affect the whole mass of air because it is brought to more or less uniform temperature by the stirrer.

Q. I wish you would answer my question, please. Will you read him my question?

A. I am endeavoring to answer it.

Mr. Ely: Will you read my question?

(Question read as follows:

[fol. 576] "Q. That is, you have to assume, then, that all of the heat units and all of the air flows over the moisture pan, or else flows out of the opening, in order to reach that conclusion, have you not?")

Q. You understand my question, do you?

A. No, I don't, will you read it again, please?

Q. That is to say, your position is, as I understand it, that none of the heat units from the eggs in the chamber will pass through that corridor or passageway and come back to the eggs again; is that your position?

A. That is my position; when we interpret what we mean by "heat", there is more heat discharged from the open-

ings and used up in humidification than is given out by the eggs within that incubator. That is my position.

Q. I do not see any difference in your position in that respect, with regard to the Smith machine, than I do with the James machine, Dr. Greene. Will you tell me what is the difference?

A. The difference is that in the Smith machine, as disclosed in the patent drawing, and as taught by the patent and specifications and claims, by putting the eggs in a particular arrangement, with the hottest eggs at the bottom and gradually getting into the eggs which are requiring heat, we can definitely say that heat is transferred from the eggs in the latest stages of incubation or hottest stages, to those in the earliest stage, and as I have said over and over again, without the Smith arrangement as indicated in his patent, you cannot make that statement, in my opinion. [fol. 577] Q. Then let me revise my question: Assuming, in the Smith machine, that we would put the hot eggs at the top of the column, assuming that condition, with the Smith machine, then your answer, with respect to this former question of mine, your operation would be the same in the James and in the Smith?

A. It would, yes. That is exactly my position.

Q. You do not mean to say, do you, that all of the heat units, as they come up through that egg chamber, whether given off by eggs or given off by anything else, divide and the heat units from the eggs go over and dip in the moisture pan or go out the opening, do you?

A. Oh, no.

Q. They enter the general column or stream of air?

A. That is correct.

Q. And a portion of that is taken out by the moisture pan and a portion of that goes out the opening?

A. That's right.

Q. And in the Smith machine, with eggs at the top, the same thing would happen?

A. Yes, sir.

Q. Why is it, then, that it does not make any difference, in the James Way machine, how you set your eggs, and in the Smith machine it makes such an awful lot of difference? Why is that?

A. Because in the James machine, any heat which is needed comes from the pipes, and there is no claim that

it does not. There is no claim that heat from the hottest eggs will be given up to the coldest eggs, to cut down the heat. He is not following the Smith teachings.

Q. No, no. Now let us get away from those teachings of the Smith patent. I am talking about the Smith machine.

A. Did you not say Smith machine?

[fol. 578] Q. I am talking about the Smith machine and James machine.

A. That is what I am talking about.

Q. You are talking about the teachings of Smith. Now, I am not talking about the teachings of Smith, as you understand them, or as you would try to have it put. I am talking about the Smith machine; now, if you will keep to that.

A. I thought I was keeping to it, I assure you. May I hear the question again? I am endeavoring to answer your question.

Q. I assume so.

A. Yes, sir; that's right.

(Question read as follows:

"Q. Why is it, then, that it does not make any difference, in the James Way machine, how you set your eggs, and in the Smith machine it makes such an awful lot of difference? Why is that?")

A. That is exactly the answer I was trying to give you?

The Court: He was asking about facts, not what the teachings are. What are the facts that make the difference in the results?

The Witness: In the James machine, the eggs are placed in, and the difference between the amount of heat required for the eggs and that required for evaporation and heat lost in the air, is made up by the hot water pipes, and therefore, so long as you maintain the chamber in which the eggs are placed for their incubation for the first 18 days or 17½ [fol. 579] days, the operation of this development of the embryo takes place. In the Smith machine, however, which I though- you wanted me to answer, in order to follow his teachings, the only way in which you can definitely say that the heat from the eggs in the later stages of incubation can be carried to the eggs requiring heat, will be with this

arrangement, whenever some of that heat, and much of the heat is delivered through a vent hole at the top.

I would like to point out, also, in the Smith teaching, we have the hottest eggs, from the 18th day to the 21st day, in the machine, to give up this large amount of heat to the other eggs.

Q. Now, Dr. Greene, in this answer you have kept talking about "Smith teachings", and I did not ask you about Smith teachings.

A. Well, on the Smith machine.

Q. I am talking about the Smith machine, not Smith teachings. Now, can you answer the question without going to anything that you call the Smith teachings?

A. All right; I will change, with the permission of the Court, every place where I said "Smith teachings", and make it "Smith machine", as practiced in the machines which I have seen. Does that answer your question?

Q. No, I did not ask you that. I asked you why it was that you can arrange eggs in any order that you want to, in the James Way machine, without affecting the operation; then why it is that you cannot do that in a Smith machine? [fol. 580] A. I understand your question. You can do it in a machine built by the Smith Company.

Q. You can do it in that machine that we saw in the warehouse?

A. Absolutely, you could put it in any way there.

Q. And your operation would be just the same as it is in the James Way?

A. Yes. I beg your pardon, your Honor; I misunderstood entirely the point of the question. That is, you can take a machine such as we saw in your room, or over in the room of the James exhibits; and I believe you could put the eggs in any position, put in the hatching eggs at the bottom, of course, for convenience, and I think it would work.

Q. And you could put the hatching eggs up at the top, if it were not for the matter of droppings and shells, and so forth?

A. Yes.

Q. That is, the hatching eggs are at the bottom, in Smith, so the litter, and so forth, will not fall on the other eggs?

A. Yes. I beg your pardon, Mr. Ely; I thought you meant, by "Smith machine", the machine following the patent. I am not trying to quibble with you. I really un-

derstood you to mean that; but so far as that machine is concerned, I would like to repeat it, built by the Smith Company—we will not give it a name—at least, you have exhibited, 52,000, I think it is called, and the James Company has exhibited—I believe you could put your eggs in that machine for 18 days in the so-called incubating sections, and then three days in some other section, and get hatches. That is my belief as an engineer.

[fol. 581] By the Court:

Q. What you mean by your answer is—I take it from your answer, you claim the machine does not conform to the claims?

A. What is that, sir?

Q. You claim this machine does not conform to the claims?

A. No, sir; the machine does conform to the claims as it is practiced, but a hypothetical question was asked me, if that machine had its eggs sandwiched as in James, would it work, and my answer is that it would work.

Q. I do not know as I just gather the significance of this answer, then. You mean, the patented device, the Smith device with eggs sandwiched in any order, would work?

A. The patent does not provide that at all, but the machine can be set up.

Q. My question was whether you claim that the claims do not cover the particular description of the particular machine here?

A. No, sir, in my opinion the teachings of the patent are perfectly definite.

By Mr. Ely:

Q. Let us follow his Honor's thought for a moment. Do you think anyone operating a Smith machine as I have described it, that Smith machine as I have described it, who sandwiched his eggs as you sandwich them in James, do you think he then would be infringing Claim 1 of the Smith patent?

A. Assuming that he could put the eggs in such a position——

Q. Now, wait a minute; I said, sandwiched eggs.

A. I understand, but you cannot do that in the Smith [fol. 582] machine as you built it because you have to bring

your eggs in at the top. You can turn them around upward but you cannot sandwich them as you build it.

Q. Now, that is, taking the racks out of the Smith patent, you understand these chain racks are an improvement over what was shown in the patent?

A. Yes.

Q. Suppose we used the same racks that were in the Buckeye machine, then we would get over that difficulty, would we not?

A. Yes.

Q. And that is the only reason why you say we cannot use the Smith machine with the eggs arranged in sandwiched relation?

A. That's right.

Q. Or in any relation we wanted?

A. Yes, sir.

Q. With the hatching eggs at the top, or with the hatching eggs at the bottom, or with the hatching eggs in the middle?

A. Yes.

Q. Is that right? I wish you would answer Yes, so the stenographer will get it.

A. Yes.

Q. Now, do you think, in your opinion, that a Smith machine operated as I have described, is covered by Claim 1 of the Smith patent?

A. If I am entitled to express such an opinion, I would be very glad to express it, your Honor.

Mr. Toulmin, Jr.: If your Honor please, my understanding is that the question of infringement is reserved for the Court's jurisdiction.

The Court: I think so, too.

Mr. Ely: You have asked lots of questions——

[fol. 583] The Court: If you raise an objection, I will rule on it. Many questions are asked here which might properly be objected to.

Mr. Ely: Do I understand you sustain the objection?

The Court: I think so. I do not think that is a proper question.

A. Shall I answer it?

Q. You may not answer that question. The objection is sustained by the Court.

Now, bearing in mind this arrangement that I have been talking about, that is, the Smith machine as we have it, with the eggs sandwiched, say,—I do not care how; sandwiched —would you then carry out, in the Smith machine, the process of hatching a plurality of eggs?

A. Yes.

Q. Would those eggs be arranged at different levels?

A. No.

Q. They would be at different positions in the column?

A. Oh, yes.

Q. And in that sense they would be at different levels?

A. Only because you say it that way.

Q. That is, that is one possible meaning of the term "arranging them at different levels", would be in tiers?

A. No, not here, at all; it is perfectly different.

Q. Do you think that eggs arranged in tiers are arranged at different levels?

A. Not in the Smith patent.

Q. No, I did not ask you that. I asked you whether you thought eggs arranged in different tiers, one above the [fol. 584] other, are arranged at different levels?

A. Eggs arranged in tiers in a storehouse, one above the other, are at different levels.

Q. All right; then if we want to import that meaning into my language, then you would have eggs arranged at different levels, would you not?

A. If your meaning is right.

Q. Of course, we are forgetting for the moment this particular disclosure in the patent.

A. I did not know that we were.

Q. Well, I wish you would, for the moment; and would you then have a closed chamber with restricted openings? I am still talking about this Smith arrangement that we have been talking about?

A. Yes.

Q. With restricted openings and sufficient capacity for the escape of foul air without undue loss of moisture; you would still have that?

A. I don't think the patent is responsive at all to the teachings of the specifications.

Q. You mean you do not think the claim is?

A. The claim is not descriptive or responsive to the specifications. The restriction, in my opinion, is entirely on the inlet side.

Q. You see, what I am asking about is the Smith machine with the eggs arranged as I have said.

A. Yes.

Q. I am not asking you about the patent. I am asking you about that as an ordinary matter of English language.

A. It does not have a restricted opening or outlet.

Q. For the escape of moisture?

A. For the escape of moisture.

Q. That is, it has a small opening, therefore, a small percentage of air?

A. Yes.

[fol. 585] Q. But you would not call that a restricted opening?

A. Not a restricted opening.

Q. I understand you could then apply a current of heated air to those eggs?

A. Yes, sir.

Q. Would your current of heated air be moving at sufficient velocity so as to diffuse and maintain the temperature throughout the eggs, the same?

A. If you fix it so, yes.

Q. That is, in that construction I have been speaking of?

A. Yes.

Q. Your answer is, Yes?

A. Yes.

Q. And would the air be vitalized?

A. I don't know what that means, in the patent. It is vitalizing——

Q. Well, suppose we say, life-giving, giving life to the embryo?

A. If it means that the current of air is vitalized—by what?

Q. I will refer you to your own patent for that; if you do not know what "vitalized" means, I will refer you to your own patent, No. 1,939,908, and I will call your attention to the use of the word "Vitalized" and "vitalization" in a number of places. You understand what it means in that patent? Here it is; I have it marked.

A. I have it marked here, too.

Q. You noticed that, did you?

A. Where is it, in the first column, Mr. Ely? On page 1?

Q. It is line 5. You will find it again in the second column in line 62.

A. May I see your copy, please?

Q. Yes, certainly. You will find it at line 62. You will find it over on the third page.

A. I know where the third page is. That is not line 5.

Q. No, here is line 5 over here. This is line 62. You [fol. 586] are looking at the wrong patent. I asked you to look at your own patent.

A. Oh, I beg your pardon.

Q. Here, take my copy.

A. This patent to Markey states that "the invention relates to improvements in heating systems for incubators of the general type in which power-driven means are employed to promote air mixing primarily for heating, heat distributing purposes and for air vitalization, by mixing, ventilation being"—I beg your pardon—"for air vitalization by mixing, ventilation being accomplished by introduction of fresh air at different points in the incubator chamber to facilitate the mixing of the air."

Q. Yes, I just wanted to call your attention to the use of the word "vitalized" in your own patent. You understand what it means there?

A. It states here, at line 5, "for air vitalization by mixing", and the discretion there is by definite mixing.

Q. Well, at any rate, the word is "vitalized" in both patents, whether one is by mixing or by something else?

A. No, I don't quite agree with you, because I have looked over this patent a number of times for the meaning of that "vitalized".

Mr. Toulmin, Jr.: What are you referring to as "this patent"?

The Witness: I am not referring to the Smith patent 1,262,860, and to my copy of this patent. Line 46 is what I looked at first, in the Smith patent: "It is possible to limit the openings and so conserve the moisture by reason [fol. 587] of the vitalizing effect of the power-driven current upon the body of air within the chamber."

Now, I couldn't make any sense out of that. I don't know what the "vitalizing" effect of power-driven current upon a body of air" is.

Q. But you do understand what "vitalizing" means when it is said to be the mixing, in the Markey patent?

A. Where we come to a description of use of the word, I have to look back to the specifications to see what it means.

Q. Well, you understand what it means in the Markey

patent? A. I know what "vitalizing" means, but I do not know what "vitalizing effect of power-driven current upon a body of air" is.

Q. Well, whatever difference there might be, there would not be any difference in this arrangement that I have talked about, this hypothetical arrangement of the Smith machine, and the arrangement shows in the patent, so far as that would be concerned?

A. No; that is true.

Q. Now, in this arrangement that I have talked about, would the moisture be conserved?

A. I think it would.

Q. And would the units of heat be carried from eggs in more advanced stage of incubation to those in a later stage?

A. They would not.

Q. That is to say that the order of arrangement of eggs makes all the difference between carrying units of heat from hot to cold eggs?

A. I think so.

Q. And we have gone over that time and time again, and you do not agree with me that the fact that air moves in [fol. 588] a closed cycle means that units of heat may be carried from eggs in a later stage of incubation to those in an earlier stage? You do not agree with me on that?

A. I do not agree with you on that.

Q. And you do not agree with these other authorities I have quoted to you?

A. No.

Q. And otherwise than that, we are in agreement that the hypothetical structure of the Smith patent I have been talking about would come within the language that I have just been quoting?

A. Well, there are very important things: The levels——

Q. You disagree with me on levels and also on the units of heat?

A. Yes.

Q. And other than that, you agree with me?

A. Yes; and, by the way, the restricted opening, we do not quite agree on that.

Q. We do not agree on the restricted opening; all right. Now, when was it you were at Kerr's Hatchery at Frenchtown, New Jersey?

A. August 26th, I think it was. (Referring to notes.) August 26th, 1933.

Q. And how many Smith machines did they have in that plant?

A. They told me, fourteen.

Q. What size?

A. They were called 52,000—no, they called them 50,000 capacity, because I remember multiplying fifty by fourteen to get seven hundred. I think it is what you call 52,000.

Q. Yes; that is, it is for 700,000 eggs, or 728,000 eggs, is that not so?

A. Yes, sir.

Q. And those are all compromised in fourteen machines?

A. That is right.

Q. How many machines were in operation when you were down there?

A. In August?

[fol. 589] Q. Yes.

A. There was one machine that was running full, and I think No. 2 did not have a full charge in it, and they told me at that time that No. 1 had been constantly in operation for about three years.

Q. And it was quite a sight, was it not, to see 52,000 eggs in one room being incubated at one time, something that you had never seen before, had never dreamed of, is that not right?

A. Oh, no; I dreamed of it many times, because I had seen the literature on the subject.

Q. But it was quite an impressive sight, was it not?

A. I don't want to say what I think, because there were several rotten eggs in there, Mr. Ely, that were not very impressive.

Q. It was quite a sight to get into the machine and see?

A. Yes, I think it was. I think 700,000 eggs in one plant is quite impressive.

Q. Quite an impressive sight?

A. Yes.

Q. Did you happen to see chicks coming off at the time?

A. No, I didn't. I heard the chicks squeaking, and the man who was with me at that time—not Mr. Weisel—pulled out a couple of the trays, but he could not quite find the tray from which the noise came, but there were chicks coming out at that time.

Q. But, as you say, it is quite a sight to see those chicks all coming off at the bottom of the machine; is that not so? Did you ever see it?

A. Yes, I have seen photographs of such things and they are very attractive.

Q. Did you ever stop to consider that there are at least seven to ten plants in the Unitted States using these Smith machines of the same or possibly even greater size than at [fol. 590] the Kerr plant?

A. I noticed in one of your circulars a lot of pictures of such plants.

Q. And there are numberless plants of smaller capacity, all the way from one machine up to fourteen?

A. I didn't count it; I presume that is possible.

Q. Did you stop to consider, with this 700,000 egg plant of Kerr's, how many of those small machines, such as the James Way, still air incubator, would have had to be employed to get the same egg capacity that you had in the fourteen machines at Kerr's plant? A. No, I never thought about that.

Q. Just how many would it be?

A. Well, it would be 700 divided by five, which would be about 140.

Q. More than that.

A. 700,000, and the Smith machine is 5,000, and five thousand goes into seven hundred, 140.

Q. The Smith machine is 50,000. I am talking about the whole plant.

A. 700,000 divided by 5,000.

Q. I am talking about the James Way machine before the one in suit here. I am talking about the old machine, the old still air machine?

A. I don't know the capacity of it; if you can tell me——

Q. Say it is 180 eggs.

A. Would you let me take 200?

Q. Yes.

A. I can divide it better. It would be 7,000 divided by two, which is 3,500 such units.

Q. You would have had to have 3,500 units of the old James Way type to get the same egg capacity you have in fourteen machines of the Smith type?

A. Yes.

[fol. 591] Q. And that means quite a considerable saving in labor?

A. Oh, yes, I should think so.

Q. And quite a considerable saving in the other items of plant operation, does it not?

A. I should think so.

Q. And quite a considerable saving in space?

A. Oh, yes.

Q. Did you ask Kerr if he would like to go back to the old machines?

A. No, I didn't ask Mr. Kerr that. I didn't see Mr. Kerr; nor did I ask Mr. Weisel. While we were looking at the machine, Mr. Taggart told me that previous to the installation of these large Smith machines, they had used the whole upper floor, and I think he said part of the lower floor. It was quite a large building, and I did get some idea from him that there was a great saving in space, but, of course, that is quite evident on the surface of it: The small 200 machines, of course, take up very much less space than one of these 50,000 machines, and if we built them three tiers high, you could not say that the small machines would take up 3,500 times as much floor space, but they probably would take up much more floor space than the space used there, but not in that ratio.

Q. And there would be the individual care required by each one of these smaller units which you do not have on the Smith?

A. Yes. Of course, on the smaller unit—I have never handled one: I have a sister-in-law who did—I do not think you have to give quite as much attention, possibly, as you would to the series of trays. I am not a hatchery man, so I do not know if you have to pull it out every day and cool it.

Q. Then, possibly your testimony is not helpful on [fol. 592] that point?

A. I do not think it is. That is why I cannot understand why you are asking me.

Q. You understand, in these smaller machines, they have individual heat controls in each one of those cabinets?

A. Yes.

Q. In the Smith they only have one heat control in each cabinet?

A. I beg your pardon; some of these smaller machines are built in batteries so one heat control of the main heat is all that is necessary, and you have your dampers on each unit.

Q. I guess I presume a little on your lack of knowledge of the incubator art because apparently you are not much up on the practical side?

A. Not very much.

Q. Kerr was getting along very nicely there, apparently, without any separate hatchers?

A. So far as I know, he has no separate hatchers. I don't know whether he would require one under the new Code, though, if he used thirty-five——

Q. We threshed out that matter of the Code yesterday to our perfect satisfaction. You would consider, as I understand it—pardon me; part of your practice is, I understand, to pass on meritorious inventions?

A. Yes, sir.

Q. Would you consider that the man who was responsible for that development in the incubator industry had made a meritorious invention?

A. Mr. Smith, you mean?

Q. No, I say, whoever might have been responsible for that.

A. If one man, yes, sir.

Q. And do you agree that Smith seems to have been the [fol. 593] first discoverer of ways and means of applying the art on a large scale so as to meet commercial demands?

A. I can't say that, when I consider the big machine that Cyphers made years ago, and some of the other machines.

Q. Do you understand that from Smith it was first learned how the number could be raised to many thousands with success?

A. With commercial success of the company, yes, I could understand that Smith did that.

Q. No, I am not talking about commercial success of the company. That was not what I said. What I said was, do you agree that from Smith it was first learned how the number could be raised to many thousands, with success?

A. And I said no, I don't.

Q. You do not agree with that?

A. I do not agree with that.

Q. You talked about the Cyphers incubator?

A. Yes.

Q. That, as I understand it, was originally set up in the answer in this case, and has since been withdrawn. Do you know that fact?

A. No, I do not know that fact.

Q. Do you not know, as a matter of fact, that the Cyphers incubator, when he tried to hatch thousands of eggs, that was a failure?

A. I did not know that.

Q. Do you not know that he tried to hatch eggs in superimposed layers, and in staged incubation, but he left out the forced draft of air? Did you know that?

A. No.

Q. Did you know that, because he did not combine the two steps of forced circulation of air and staged incubation, [fol. 594] that his eggs burned up in the machine and the thing was a failure?

A. I could imagine that they would.

Q. And Cyphers was one of the big incubator men of those early days, was he not?

A. As far as I could read.

Q. And he did not conceive the idea of putting together staged incubation and forced draft? He did not conceive that, did he?

A. From what you say, he did not, but I don't know that to be the fact.

Q. And that was probably why the thing was a failure?

A. Might have been.

Q. And Cyphers had plenty of money, because he was one of the big incubator manufacturers in this country?

A. I didn't realize he was. I thought he was a man up near Bethlehem.

Q. He was up at Stroudsburg, Pennsylvania, and he was the manufacturer of the Cyphers incubator.

A. I knew he became that, after.

Q. And he was one of the parties in the Cyphers litigation that has been referred to by Counsel, here, in this Circuit?

A. Yes, I think so.

Q. And he did not solve the problem of mass incubation because he did not put together staged incubation and forced draft?

A. But others had done it at the same time.

Q. Pardon me. I disagree with you on that. Where do you find, in the prior patents to which you have referred, the combination of staged incubation and forced draft?

A. A very good illustration of it.

Q. Whereabouts?

A. An excellent illustration, in my opinion.

[fol. 595] Q. What patent?

A. In the patent to Bell, 691,837, of 1902, your Honor, in which we have a forced circulation by means of a heated lamp; we have an arrangement of eggs in trays, superimposed; we have a return duct; we have the control of moisture, and the control of fresh air.

Q. Now, in the Bell patent, the only thing which makes any circulation of air is that lamp which is at the bottom, is it not?

A. A lamp, or a larger machine, as he says—I think this is the one; on page 2: "It will be understood that the filling between the inner and outer walls of the incubator may be of sawdust, cinders or other suitable material, and instead of the ordinary illuminating lamp, an oil or gasoline stove may be used, and, in fact, any preferred or particularly adapted means for heating may be employed."

Q. Any of the currents which are generated by any of those things described in the Bell patent would still be what you call gravity currents?

A. Yes, sir.

Q. And would not be created by means other than variations in temperature?

A. Would be created by variations in temperature.

Q. In other words, it is not a forced draft of air; it is a draft of air solely by convection, as it is called?

A. A forced draft is a draft produced by high pressure, and as I tried to explain in my opening remarks in this case, I have known where the hot gas method and chimneys have been substituted for mechanical fans.

Q. Yes; you are talking about the stack of a chimney such as you find in a plant?

A. Yes.

[fol. 596] Q. But you do not get a forced draft of air sufficient to circulate the air through that machine by a lamp?

A. I would not say you couldn't.

Q. You would not say you could not, or you would not say you could? I did not get your answer.

A. I believe you could.

Q. It shows there a lamp, and then the only means by which the draft would be created and carried up would be due to the heat generated by the lamp?

A. And the eggs.

Q. The heat generated by the lamp and the eggs?

A. Yes.

Q. And that would be what we would call a gravity current, what you call a gravity current of air?

A. Yes.

Q. And that was what Mr. Cyphers had; he had gravity currents of air, did he not?

A. I think he did.

Q. Yes, and the Cyphers machine was a failure. Take my word for it, or not, as you like. In fact, you have never seen the Cyphers machine on material of that type?

A. No.

Q. In the Bell patent you do not have, let us say, a fan-impelled draft of air?

A. We do not.

Q. And in that sense, we do not have a forced draft of air?

A. If that is the definition of "forced", that is right.

Q. That is, you do not have, in the Bell machine, a current created by means other than variations of temperature?

A. That is right.

Q. You do not have that?

A. We do not have that.

Q. And that phrase which I just read is one of the ele- [fol. 597] ments of Claim 1 of the Smith patent, is it not?

A. That is correct.

Q. Now, where do you find, in the Bell machine, a description of staged incubation? Show me everything that is in that patent that says anything about staged incubation.

A. In the first place, as I think is very evident there, what you say of the Cyphers patent——

Q. Now, we are not talking about the Cyphers patent. We are considering the Bell patent as a disclosure by itself.

A. Reading from page 1, line 14: "It is furthermore designed to provide for effectively ventilating the interior of the device so as to preserve the proper temperature for the unhatched eggs and also for the recently hatched chickens, and at the same time to prevent the incubator from being chilled too rapidly.

Q. Now, that is the only place, is it, in the patent, where there is any reference to what you call staged incubation?

A. From the wording, yes, sir.

Q. Might that not reasonably mean that the temperature was proper for the unhatched eggs, and then, when the chicks were hatched, the temperature would still be proper within that house?

A. It couldn't be, in a house of this size.

Q. Is it not a fair interpretation of that language, as well as the one that you have read into it?

A. It might, if you do not consider the size of the machine, which is built for great capacity, the number of thousand not being stated; a house with a corridor of superimposed eggs, and with that picture before you and these words, I took the interpretation which I did.

Q. There is nothing in the patent stating that those eggs [fol. 598] are set at different times?

A. There is nothing in the patent that states that.

Q. And it might be, from the disclosure, that all those eggs were set at once?

A. Yes.

Q. There is no clear disclosure in that patent of staged incubation?

A. Not in plain words.

Q. And it is something that you have read into the patent, possibly from the exigencies of your present situation, is that so?

A. No, I don't think it is from the exigencies. I think it is from the facts in the case.

Q. And yet you have just said there is no clear disclosure of staged incubation, and there is no clear disclosure of current of air propelled by other means than variations in temperature?

A. That is true.

Q. Do you consider that that is the best reference to the Smith patent?

A. No, I don't think it is the best.

Q. Well, now, find me another patent that you think has staged incubation and forced draft in it.

A. Well, I think Stulik.

Q. All right, let us look at Stulik. Now, in the Stulik patent——

Mr. Ely: Will your Honor look at the Stulik patent, please, because that is the thing that has been in every litigation. It has been in these cases, and every defendant says that it is the best reference, so I wish you would look at it. Have you got the Stulik patent, your Honor?

The Court: Yes. What is the number?

Mr. Ely: It is that German patent. Every defendant that comes up cites that Stulik patent.

[fol. 599] The Witness: The first one, your Honor, No. 1.

The Court: Yes, I have it.

Q. Now, in that Stulik patent, we have a sort of chimney or house, do we not? We have a sort of chimney?

A. That is right.

Q. And that chimney is open at the top, with a vent?

A. That is right.

Q. And at the bottom is a hot air generator of some kind or other, stove of some kind, is it not?

A. Yes.

Q. And hot air comes in at the bottom, does it not?

A. Yes, sir.

Q. And goes out at the top?

A. Yes, sir.

Q. Now, there is nothing to force that air through except variations in temperature?

A. That is right.

Q. Now, you set your eggs, in Stulik——

A. I beg pardon; that blows the heat from the eggs.

Q. All right. Now, in Stulik, you set your trays of eggs beginning at the bottom, do you not?

A. The earliest eggs are at the bottom, and the air circulating through the system strikes the coldest eggs first.

Q. And then goes on progressively up to the hottest eggs?

A. Yes.

Q. And then goes out at the chimney?

A. Yes.

Q. Therefore, in the Stulik patent you would never carry units of heat from the hottest eggs to the coldest eggs, would you?

A. Only in the method which you are endeavoring to read into the James machine; that way you would.

Q. Well, now, wait a minute. I asked you the disclosure in the Stulik patent. I did not ask you to trap me in any-

[fol. 600] thing. I am asking you the plain out and out question, in the Stulik patent, is there any way by which the heat from the oldest eggs can get back to the coolest eggs?

A. Yes. By return through the room from the top to the bottom.

Q. I just want to go into that because I noticed you said something like that on your direct examination. Now, the heat units as they come out of the Stulik machine, are going on up to the ceiling, are they not?

A. Yes.

Q. And they will not come down and enter in at the bottom of the chamber and until they are cold and the air will not come down until it is cold?

A. No.

Q. And, therefore, the air will not enter into the base of the Stulik machine until the heat units have been dissipated through it, is that not true?

A. Not the egg heat units; they may stay in.

Q. We are talking about units of heat from the eggs in the later stages of incubation?

A. That is what I am talking of.

Q. Any units of heat which are imparted to that air will be carried by the air to the ceiling of the room?

A. That is true.

Q. And the only way the air will get down from the ceiling of the room is when it is cooled off or chilled?

A. No.

Q. Because that is the only means by which the air is going to get down?

A. No, that is not true.

Q. How will it get down?

A. If there is forced circulation of air, air has to be sup-[fol. 601] plied to that tube, and creates a vacuum behind it, and will suck air down. That is, air does not have to be cold—it has to be warm to rise, that is true, but the air must come back and the hot air must come back.

Q. But it will lose its heat units; in other words, if we set this Sulik machine in this room today and the hot air units would rise out of the chimney, do you mean to tell me those hot air units would come back down and enter the machine?

A. Some might.

Q. But they would not?

A. Not all.

Q. They would not, any of them?

A. No, I couldn't say——

Q. That is a perfectly absurd theory of yours, is it not?

A. No.

Q. You are going to say, if you put the Stulik machine in this room, the units of heat are going to go from those hot eggs up to the ceiling, still as units of heat, and come down and go into the machine again.

A. I say individual heat units might do that.

Q. Do you agree with this statement with regard to the Stulik patent:

"The movement of motor driven heated air in Smith is unlike the movement of heated air in the German patent to Stulik, confidently cited by the respondent, where it starts at the bottom of a chamber and ascends straight up through trays of eggs of different temperatures, and goes out at the top. In Smith, after the air enters, there is no quick exit. The first requisite is a closed chamber, and from this [fol. 602] chamber no air except foul air escapes; the main body is retained in the chamber and is moved in cycles through the corridor and egg columns around and around, on and on, without any defined end. If, as in Stulik, the air entered, ascended and departed, passing the eggs but once, then manifestly, the heated air, in order to pick up heat units from warm eggs and use them in warming cool eggs, must first strike the warm eggs—those in the more advanced stage of incubation."

Do you agree with that discussion of the Stulik patent?

A. All except the latter part, and then I only differ in the fact that some heat might come back; otherwise the statement is quite clear.

Q. One or two heat units might stray back?

A. I won't say how many.

Q. As a matter of fact, there is no description of anything of that kind in the Stulik patent?

A. That is correct.

Q. And that is something you have read into the Stulik patent?

A. Yes.

Q. As a matter of fact, you do not have the forced draft of air in Stulik, do you?

A. If you define forced draft of air produced by other means than difference in temperature, you do not have it.

Q. You are using exactly the language of the claims of the Smith patent when you make that answer?

A. Yes.

Q. And you say that is not found in Stulik?

A. That is correct.

[fol. 603] Q. And you also say that the chance for the unit of heat from the hot egg in Stulik, to come back, is extremely remote, do you not?

A. I won't say how remote.

Q. It is remote, however, is not not?

A. It all depends on how large the room is and what its form, and all the other details.

Q. When you made this Stulik machine that is down at the warehouse, your people put the casing right around that Stulik machine, did they not?

A. They did two things; they tried it without and with. Yes, they put the casing around.

Q. You did not find any such casing in the teaching of the Stulik patent, did you?

A. Not in the drawings, no, sir, nor in the specifications.

Q. That was something that was added entirely out of your own head?

A. Yes.

Q. And your purpose in doing that was what?

A. To show that this machine would work to recirculate the air if built that way.

Q. If the outer casing was put on, which was entirely outside of any disclosure in the patent?

A. There is nothing in the pictures.

Q. Have you got any other good references?

A. Oh, yes.

Q. Let us have them.

A. As I stated last week, the patent to Gardner, the British Patent, of an early date, 1887, shows clearly the peculiarities, the eggs in the late stages of incubation, and also the temperatures which should be around such eggs, and clearly points out that fans or other devices could be used for circulating the air. In this patent, the staged incubation

is done in separate divisions. However, the teaching of [fol. 604] the requirements of staged incubation and the methods of bringing the heat to the eggs and removing it, is clearly shown.

Q. I do not dispute for one minute, Dr. Greene, that the charactertistics, the thermal characteristics of eggs in their various stages of incubation, was not something that Dr. Smith discovered, that physical fact; I do not dispute that for a moment, that they have known from old times, that eggs got hotter as the embryo developed. I do not dispute that for a moment. Now, in that Gardner patent, you have got a series of cabinets arranged in a row, have you not?

A. That is right.

Q. A lot of pigeon holes, you might say, large pigeon holes, possibly?

A. Yes.

Q. And in that you set trays of eggs?

A. Right.

Q. Now, each of those pigeon holes is connected by a pipe to some main duct, possibly, is it not?

A. That is correct.

Q. And that main duct has got a fan in it that is drawing the air through the chambers?

A. A fan or an inspirator.

Q. A fan or an inspirator that is drawing air from the chambers?

A. Yes.

Q. So that air, as it passes through one chamber, passes out into the duct?

A. Yes.

Q. And it will not get into any of the other chambers?

A. That is my understanding.

Q. And the eggs in various stages of incubation are set in different chambers?

A. That is right.

Q. And those chambers are maintained at different temperatures?

A. That is correct, sir.

[fol. 605] Q. Because of the characteristics of the eggs at those various stages?

A. Yes, sir.

Q. Then there will not be any heat units from the eggs in the later stages of incubation carried by that air to eggs in the earlier stages, will there?

A. Not by that means, no.

Q. Not by the means described in the Gardner patent?

A. No.

Q. And as I understand the Smith patent—and disagree with me or not, as you like—is this correct; I will put it this way; is this a correct statement of the Smith patent, that you maintain a temperature substantially uniform throughout the chamber?

A. That is the wording of it, yes, sir.

Q. And then your temperature of the air around the cold eggs is substantially the same as the temperature of the air around the hot eggs?

A. That is what the wording means.

Q. And you have in the Gardner patent, however, the temperature of the air difference on each of the different sets of eggs?

A. That is correct.

Q. And there is no fan-impelled draft of air that is going through eggs in staged incubation in a circuit?

A. In a circuit, no.

Q. And the only passage of fan-impelled air is going right through eggs in one stage of incubation and out this flue, is that not so?

A. That is correct.

Q. Have you got any other good references?

A. Now, of course, one of the oldest references in point of issue is the Meschter.

Q. Do you think that is a thing that knocks the Smith patent out? Do you think that invalidates the Smith pat-
[fol. 606] ent?

A. I think it is one of the elements which we have to consider.

Q. I asked you—what we started out with was something that would knock the Smith patent out, invalidates it?

Mr. Toulmin, Jr.: Your Honor, is not that calling for a conclusion that is reserved to the Court?

Mr. Ely: I am asking the witness to pick out a patent which, in his judgment, invalidates the Smith patent, and I do not see any object in discussing the other patents.

The Court: He says it is this patent to Meschter. Now he is cross-examining with reference to the particulars of that patent.

Q. I want to know what the force and effect of the Meschter patent is, in your judgment.

A. In my judgment, the patent to Meschter teaches very clearly staged incubation, placing the earliest eggs in a chamber quite independent from the other, moving the eggs from that chamber into a later chamber, the later chamber being one of two or more. As I pointed out, he shows in this particular embodiment three chambers in all, the first chamber and two later chambers, but he distinctly says that these could be made larger. In that later chamber there is a distinct circulation between the two chambers of the later stages, and in the sense of heat from these later stages being added to the circuit of water, I believe that heat of the eggs in the later stages does contribute to this in the bot- [fol. 607] tom chamber, although there is no air connection.

Q. That is, if there is any transfer of heat from the eggs in the later stages of incubation, it is because of the circulation of the water?

A. Yes.

Q. That is, we are not carrying the heat units by currents of air?

A. No, it is by current of water.

Q. And therefore, you are not doing what Smith did and what the James Way is doing?

A. I do not think that Smith calls for his method of changing the heat. I may be wrong. I will just read it. It says here, in Claim 1, that the heat is carried from the eggs in the more advanced stage of incubation to those in the less advanced stage for the purpose specified.

Now, I am looking at the commas of this one sentence, and I presume that this heat unit——

Q. Then it must be carried by current of air?

A. I think possibly it must be.

Q. It must be carried by current of air because there is no other way?

A. Of course, in this disclosure, it is by air, and if this is responsive to the drawing, it must mean air, and in this other case, if delivered to that early stage, it comes only from the circuit of water.

Q. That water is contained in a rather peculiarly shaped water jacket, is it not?

A. It is a water jacket surrounded on the outside with a non-conducting covering.

Q. And that water is heated by a lamp below, is it not?

A. Yes, sir.

Q. And the water, as it is heated, will rise to the top of that container, will it not?

A. Yes.

[fol. 608] Q. Just the way the water in your boiler downstairs in the cellar is hot at the top?

A. That is correct.

Q. And it will not go down again, and there is no means of circulating except as the water cools and comes back down again?

A. No, that is not so. You see, as soon as you start an up-current, since this is a body which has a fixed volume, you start an up-current and you bring back a down-current; you cannot help it. That down-current is produced by the hotter current. Now, whether the material has cooled off sufficiently enough after this starts is not in it.

Q. I noticed the same thing in the boiler downstairs, in the ordinary hot water boiler for servicing a house. If you go down and put your hand on it, you will find the hot water is at the top, and it gets colder as it goes down?

A. That is absolutely true.

Q. That is gravity, whatever movement there is in the water in that boiler is by gravity?

A. Yes, difference in weight between the two columns.

Q. And the eggs in the top of that machine will then be subjected to the influence of the hottest water?

A. Probably.

Q. And those eggs——

A. I think you would answer that better by looking at Fig. 8 of this drawing, where you will note that the hottest water rises up the side and then it returns through the middle, so you have both hot and cold water around each section.

Q. The only thing that makes the water return is the fact that it may be colder on settling to the bottom?

A. Part is hot and part is colder.

[fol. 609] Q. The eggs on the top are subject to the influence of the hottest water?

A. No, I should say to be exact that the water is being cooled by radiation as you go up and really the hottest water of all is that which—now looking at Fig. 1—the hottest water of all is that which is along the bottom of the supply channel, wherever that is; now, as a mass of water and to get this circulation and the body of water up to the top, it must be hotter than the water in the return channel otherwise it would not work.

Q. That is to say, you think the hottest water is the water which is at the bottom?

A. It must be that which is coming from the heater in your own home.

Q. And which passes along the cold eggs first?

A. And which passes along the cold eggs first.

Q. Then it will not carry any air from those eggs and carry it up to the hottest?

A. I beg your pardon.

Q. If, as you say, the water is hottest at the bottom?

A. It is not hottest at the bottom, in the supply pipe.

Q. That passes by the cold eggs first?

A. Yes, sir.

Q. These cold eggs are not giving off any heat units?

A. From that water?

Q. They are not giving off any heat units to that water?

A. To that particular water, yes.

Q. This is not a forced draft machine, is it? And the heat is not carried by a current of air except at the top, as called for by the Smith patent?

A. From the bottom, no, sir.

Q. Have you any other good patents?

A. Oh, yes.

[fol. 610] The Court: We will suspend for five minutes.

(Short recess.)

Q. Let us have another good patent?

A. Now, there are a group of patents, Mr. Ely, which with the teachings of Gardner, Stulik and McAslan as to the requirements, and I would like to add also to that, Perkins. There are a number of patents which come from the heating and ventilating art which I think are particularly pertinent in this case. I refer particularly first to the patent of Peters and Hungerford, 843909, which as I explained to the Court this morning, controls the air as to tempera-

ture, humidity and velocity and freshness, to suit the requirements of the space which it is caring for. I think that the patent to Freas.

Q. To whom?

A. Freas, which is for a device used as an incubator in biological laboratories.

Q. That is for incubating or for raising bacteria serums, and things of that kind?

A. Yes, for incubating such eggs and as I pointed out to the Court, this device of Freas——

Q. Just name them over Doctor, and I have another question.

A. The device of Freas contains an arrangement of a restricted entrance for fresh air. It has a thermostat and a supply of heat to maintain a uniform temperature and it has a fan method of producing a draft as is also the case in the Peters and Hungerford. It does not, however, reflect or disclose in the patent, any method of humidification.

Then, we come to the patent of Goldstein, which has [fol. 611] within this apparatus, a method of maintaining temperature, humidity and circulation to suit the material cared for in the device and lastly the Schwartz patent.

Q. For ordering tobacco which comes in the same way?

A. Yes, for ordering tobacco.

Q. Now, which of these various patents shows the combination of stage incubation and forced draft?

A. As a single device?

Q. Yes.

A. There is none.

Q. None shows it?

A. If you take Stulik out of the forced draft, and by forced draft, you mean from a fan, I presume.

Q. Yes, sir, what one of those patents do you consider the best reference?

A. That is a very hard thing to say, Mr. Ely.

Q. Well, if this was your lawsuit and you had to stand on one point, which patent would you pick as the one you wanted to stand on?

A. I should say the Schwartz patent, 535175, of 1895.

Q. That is the patent for ordering tobacco?

A. That is the patent called "method of an apparatus for ordering tobacco."

Q. Now, which of these patents makes any use of the Units of heat of eggs in a later stage of incubation for

bringing up eggs in the earlier stage of incubation? In other words, which of these patents utilize the heat units from the older eggs and puts them to work in assisting in the incubation of the eggs in the earlier stages?

A. In the true sense of the meaning of that expression, I do not know of any of them.

Q. And that function is performed in the Smith patent, is it not?

A. It is, yes.

[fol. 612] Q. And is it or is it not performed in the James Way?

A. It is not performed in the James Way.

Q. That is where we split?

A. Yes, if we did not split then we could say that Schwartz, if eggs were placed in his device would do exactly what Smith teaches.

Q. You have got to go to Schwartz and you have to add to Schwartz the putting of eggs in *in* stage incubation in Schwartz, which is not suggested in Schwartz?

A. It was known as the——

Q. It was not suggested in the Schwartz patent?

A. No, it was not suggested in the Schwartz patent, the Schwartz patent is used as he says here very distinctly——

Q. For the ordering of tobacco?

A. Yes, that is the important thing but I think there are some further words I would like to read if I can find them.

Q. Well, you will not find anything in there about using the units of heat in the later stage of incubation for bringing the eggs up or helping maintain the incubating temperature will you?

A. Just a moment, I am reading, excuse me. Reading from page three, line 29, "it will be manifestly obvious to those skilled in the art to which my invention appertains that still further modification as to details of construction of apparatus and arrangement of the device connected therewith may be made without departing from the spirit and scope thereof", and, "I do not wish to be understood as limiting myself to these precise arrangements of all parts of the apparatus as illustrated."

[fol. 613] Q. That is your sole basis in the Schwartz patent for the statement you made?

A. No, I think he teaches it. He does not definitely say anywhere that this could be used for egg stage incubation.

Q. Do you understand that in ordering tobacco you are dealing with living things, like the embryo in an egg?

A. No, I don't think so.

Q. And you are not dealing with a substance which at one time is endothermic and another time in the same process is exothermic?

A. I think in this machine it is exothermic throughout.

Q. There is no time tobacco is endothermic, you do not have tobacco which is endothermic and exothermic?

A. I think in this, the air being heated by the heat given off by the condensation on the leaves.

Q. The material treated is not giving off heat at one time and taking up heat at another time during the process?

A. In this device heat is being given up, I think, by the material treated and, of course, as a whole in the egg chamber you would have the same thing because there is more heat generated in the exothermic eggs than the endothermic eggs.

Q. Let us get back to the proposition of tobacco; in the ordering of tobacco you do not have a point on one side of which the tobacco is endothermic and have to have heat applied to it and on the other side of the point the tobacco becomes exothermic and give- off heat?

A. I don't know that at all, and from the reading of this patent I think that it is entirely exothermic, that is my belief. I do not even know that from definite experimentation.

[fol. 614] Q. And there was no one in the prior art, from what you said that made any suggestion about using heat from exothermic eggs to heat up the endothermic eggs?

A. No, not in those words, still it comes very near to it by saying that by having his hot air bathe the cold eggs first and then afterwards the air which has given up some of its heat bathes the warmer eggs, and keeps them cool, he is enabled to maintain within this temperature a uniform temperature and that really was what Smith was aiming for.

Q. In other words, Stulik recognized——

A. The varying characteristics in eggs in varying stages of incubation.

Q. But he did nothing as far as you can find, in the patent, to put those units of heat given off by eggs in the later stages of incubation, to work on the colder eggs?

A. Nothing in his patent ever indicated a way in which it might happen. Mr. Stulik takes a different pholosophy of his incubation from that of Smith. They both, however, are aiming for the same thing, namely the uniform temperature or substantially uniform temperature, and of course, the licensee of Smith, now knowing that can be done, is arranging the eggs that way. That is, the Smith teaching is a definite teaching which is absolutely true in my opinion, and only as Smith describes it.

Q. I understand that, Doctor, and I wish you would not get off on that track when I am asking you definite questions about something else?

A. I was talking about something else—about Mr. Stulik. [fol. 615] Q. Then, your statement is there is nowhere in the prior art anyone who has suggested using the heat which is given off by the eggs in their later stages of incubation and applying that heat to colder eggs that are in the earlier stages of incubation?

A. As far as words are concerned, that is true.

Q. And as far as structures are concerned also?

A. As far as the indication on the drawings in words, from which you can get only one meaning, we do not find it on any of the drawings.

Q. And you do not find it in the specifications of any of these prior art patents?

A. No.

Q. Let us go to the James for a minute and see if James is using heat from eggs in the later stage of incubation and applying that heat to the eggs in the early stages of incubation. Let us consider that a minute. In the James Way incubator, in the egg chamber, you have eggs sandwiched in there all the way from one day old, all the way up to 17½ days old?

A. Yes, that is correct.

Q. And you understand in the form of operation of the James Way machine, they may be kept in there from 18 to 19 days?

A. That is correct.

Q. The eggs that are in that chamber are divided between endothermic and exothermic eggs; they may not be divided

at the half way point but some of those eggs, a substantial quantity of those eggs are in the endothermic condition?

A. That is right.

Q. And a substantial quantity of them are in the exothermic condition?

A. That is right.

[fol. 616] Q. And those eggs are located in the same chamber?

A. Yes, sir.

Q. And there is a current of air playing on those eggs?

A. That is right.

Q. Then, the current of air from playing over the eggs that are in the exothermic condition, must pick up heat units from those hot eggs, must it not?

A. It must.

Q. And in passing over the eggs that are colder it must give up heat units to the colder eggs, must it not?

A. Heat units, yes, sir.

Q. And heat units that are imparted to the air from the eggs in the later stages of incubation are necessarily going to be carried to the eggs in the earlier stages of incubation?

A. Oh, no.

Q. You cannot help it, can you?

A. Yes, you can, by position. If you will let me take your Exhibit I can indicate it very nicely because you have it drawn in just the form that will help us.

Q. Have any of those you like, Professor?

A. On Exhibit 27 of the plaintiff, in the lower left hand corner we have one of the eggs in the most advanced stage. At the top ends from this column, as I recall it, about 1200 heat units are delivered from the whole column of eggs per day per thousand eggs, and this air before it returns to the stirrer, has to pass over the hot or humidifying pan, the water pan, and give up some of the active heat to vaporize the water and since an amount of the circulating air, possibly, in the Smith machine two or two and a half per cent., carries with it three times as much heat as has been given [fol. 617] off from these eggs, I think it is very evident that from this one hot egg, without considering any other, none of that heat will be returned to the column.

Q. None of that heat will go around through the circuit and come back to the egg down at the bottom?

A. Not unless you label a particular heat unit with some sort of flag.

Q. You understand this is diagrammatic?

A. Absolutely.

Q. You have exothermic eggs scattered through that column?

A. That is correct.

Q. And you have got endothermic eggs scattered throughout that column?

A. That is correct.

Q. What is going to prevent heat given off by the exothermic or hot eggs from being imparted to the endothermic eggs in the same column?

A. Nothing.

Q. That would be true of these other four arrangements?

A. Wherever the column of air strikes on exothermic egg and immediately strikes an egg in an endothermic condition, heat will be taken across.

Q. And you understand that in this particular arrangement at some point during the process, the exothermic, which is the 17½ or 18½ day egg, is going to be at the bottom of the column?

A. There may be an occasion.

Q. There will be some endothermic eggs in the column above it?

A. Yes, sir.

Q. What is to prevent air carrying heat from the exothermic to the endothermic egg above?

A. Nothing.

Q. It will do?

A. I think it will.

Q. You do carry heat from the exothermic to the [fol. 618] endothermic in the James Way?

A. When you have a definite position such as taught by Smith.

Q. I did not talk about anything taught by Smith. We are talking about the arrangement shown by James Way.

A. When it is arranged as shown in Smith, in this arrangement, you will get this effect, and when exothermic eggs are placed below endothermic eggs.

Q. And in the James Way you have exothermic eggs below endothermic eggs?

A. You will have them.

Q. And you cannot prevent them?

A. No.

Q. You cannot prevent heat being carried from the exothermic to the endothermic eggs?

A. That is true.

Q. And heat will be carried from the exothermic eggs in the James Way to the endothermic eggs?

A. At particular times.

Q. That will always happen?

A. That will not.

Q. When you have eggs sandwiched in the James Way, exothermic and endothermic eggs sandwiched in that column there in any arrangement whatever, units of heat will be carried from the exothermic to the endothermic eggs, will it not?

A. It will not.

Q. In what arrangement will that result occur?

A. In the Smith arrangement.

Q. Will it occur in the James Way?

A. It may occur when the James Way falls into the Smith arrangement.

Q. And will it not occur when the James Way is set with the eggs sandwiched, hot and cold eggs?

A. No, sir.

[fol. 619] Q. That is your testimony, is it not?

A. That is my testimony.

Q. Notwithstanding the fact that the air current is going to pick up heat from those exothermic eggs, because the eggs are hotter than the air current, and they are going to transmit heat units to the endothermic eggs because the endothermic eggs are colder than the air current, that is true.

A. The heat given up by the exothermic eggs, provided those eggs are not below the endothermic eggs will never reach the endothermic eggs but will go out through this opening.

Q. And in the James Way, any arrangement shown by them, there will always be exothermic eggs below endothermic eggs?

A. At times, yes.

Q. There always will be a time when heat is carried from exothermic to endothermic eggs, is that not so?

A. Whenever in the James Way, when a hot egg is below a cold egg, heat will be carried from the hot egg to the cold egg.

Q. There are always hot eggs below cold eggs in the James Way?

A. Some times.

Q. Isn't the answer unqualifiedly "Yes"?

A. With certain eggs, that is true.

Q. Isn't the answer "Yes", unqualifiedly?

A. It is not.

Q. Have you not in the James Way incubator, in any arrangement of sandwiched eggs, always exothermic eggs below endothermic eggs?

A. In the lower left-hand picture I have called your attention thereto, and in which you have no change in the water pan, nor have you indicated the amount of heat removed, the hot egg at the top have no cold egg at the bottom.

[fol. 620] Q. Then, you agree with me, do you not, that in any arrangement of James Way incubators, heat units will be carried from hot eggs to the cold eggs?

A. From some hot eggs to the cold eggs, not from the hot eggs to the cold eggs, no, Mr. Ely. I want you to realize that in James Way the hot eggs are not in the incubator, they are up in the separate hatcher.

Q. You must not forget that in the James Way you have eggs past the 11th day of incubation and giving off heat?

A. Yes, sir.

Q. You may not be using all the heat units given off by the eggs during the entire process, but you are using heat units given off from the 11th to the 17½ day.

A. That is true, sir.

Q. You may not utilize all the heat given off by the eggs, but you utilize some of the heat given off by the eggs?

A. You use some of that heat.

Q. That heat enters into the air column just as it enters into the air column in the Smith?

A. Yes, sir.

Q. When you first start filling it with eggs in the first 18 days of the operation, do you consider the machine in that operation is carrying heat from exothermic to the endothermic eggs?

A. In the 18 days?

Q. You understand in the Smith we start filling it with eggs and 18 days after we start the incubator going we have only eggs up to the 18 days?

A. Yes, sir.

Q. Would you say in the Smith in that condition you are utilizing heat from the exothermic eggs onto the endothermic eggs?

A. I would.

Q. With that condition, the situation in the James Way [fol. 621] is the same as the Smith?

A. Up to 18 days?

Q. Perhaps up to the 19th day, in the James Way, if they carry the process on to the 19th day?

A. Yes, sir.

Q. Do you consider that the Buckeye machines, which you saw over at the warehouse, are operating under the Smith Patent, for example, Claim 1?

A. I don't think——

Mr. Toulmin, Jr.: I object, that is calling for a conclusion as to whether there is an infringement or not, because the Buckeye machine comes within the Smith Patent, that is a question of infringement.

The Court: The question in that form may go out.

Q. The Buckeye machine was shown to us, you recall.

The Court: Ask him to describe the Buckeye machine and show the parts as compared to the Smith machine.

Q. Now, Dr. Greene, do you consider that the matter of size affects the process?

A. Size?

Q. Yes, size of the machine affects the process.

A. Well, I do think that the Smith Patent, as taught, is for a mam-oth machine; he distinctly says so.

Q. That is your reading of the specification of the Smith patent?

A. Yes, and he distinctly illustrates it in his drawing, he talks about a machine of large size, and as you pointed [fol. 622] out this morning, that in many cases this large size saves space and so forth, when it is organized on the disclosure made in this patent; I should think that size would come in.

Q. You have tied up size with what you call the man-entering corridor, have you not?

A. Yes, sir.

Q. There is not any man-entering corridor in a Buckeye machine, is there?

A. The Buckeye machine which I saw might be called a corridor, and I believe men go in there to adjust fans but not to put eggs in.

Mr. Toulmin, Jr.: We object to going into this Buckeye machine, it was not gone into on the direct examination of this witness at all and we are now going into an inquiry whether the Buckeye machine is an infringement.

Mr. Ely: You sought to make the point that the Smith is limited to a man-entering corridor.

Mr. Toulmin, Jr.: That is an arrangement between the Buckeye and you, but it has no bearing on this lawsuit, as to any interparty agreement, there is no proof in this case that the Buckeye comes in unless the Court has a decision to make on the question of infringement of the Buckeye as well as infringement of the James.

The Court: It does not appear from the design attempted by the claim, as to whether it is essential to the validity of the claim that it must or must not be a man-entering cor-[fol. 623] ridor suitable for passage by an individual.

Mr. Toulmin, Jr.: If that is their position, they have to prove that, they can put their testimony in in rebuttal and not through this witness who has not been asked about that.

The Court: I do not think we need bother with that, Mr. Ely, I think the diagrams speak for themselves.

Mr. Ely: All right, your Honor.

Q. Do you find anything in Claim One of the Smith patent, any talk about a man entering corridor there?

A. No, sir.

Q. That is a claim to a process of hatching eggs, isn't it?

A. Yes, sir.

Q. There is nothing in that claim about whether a man goes inside or not?

A. That is correct.

Q. Might that be carried out by a machine in which a door opens from the outside and which you put eggs in from the outside, just as well as a machine you put eggs in from the inside?

A. I have not looked into that to make a definite answer.

Q. You do not find that; there is nothing about a corridor in Claim One?

A. I distinctly said that.

Q. There is nothing about size in Claim One, is there?

Mr. Toulmin, Jr.: If you are going into the question of construction as claimed, I hate to object so much, but I [fol. 624] think the question of whether or not the construction is in accordance with the claim is for the Court and not for the witness. Some ambiguity of some particular statement is the only question which would be inquired into.

The Court: He can state whether there is anything in the patent about the size. Is there anything in the patent?

The Witness: There is in the patent specification, but not in claim 1, 2 or 3. In claim 5 the corridor is brought in.

Q. Is there anything in Claim 1 about tilting the eggs, tilting the egg trays?

Mr. Toulmin, Jr.: We still object to getting into the question of the claims. We think your Honor, that is a matter for the province of the Court.

Mr. Ely: I call your Honor's attention to the fact that it is one of the things of the alleged device, that James never tilts his trays and Smith tilts his trays.

Mr. Toulmin, Jr.: That is for the Court to determine.

The Court: I think it is competent in view of that inquiry. The objection is overruled.

Q. Is there anything about tilting the trays in Claim 1?

A. In the patents?

Q. In Claim 1?

A. No.

Q. Now, I understand it, or is it your understanding, that not a single element of Claim 1 is found in the opera- [fol. 625] tion of the James Way machine?

Mr. Toulmin, Jr.: Your Honor, may it be understood that my objection stands to all similar questions and the Court will grant us an exception, please.

The Court: Yes.

The Witness: May I have the question, please?

(Question repeated by the stenographer as follows: "Q. Now, I understand it, or is it your understanding, that not

a single element of claim 1 is found in the operation of the James Way machine?")

A. Yes, Claim 1 of the Smith patent, 1,262,860 calls for the method of hatching and a plurality of eggs. James does not hatch the eggs in the sense Smith uses the word throughout his patent. "To arrange them at different levels in a closed chamber", he does not do that in the sense of the Smith patent "having restricted openings of sufficient capacity for the escape of foul air without undue loss of moisture and applying a current of heated air". This said restricted opening is in the closed chamber. James does not have that. "Said current being created by means other than variations of temperature"; James does have that.

Q. Pardon me just a moment, in the sense of a current?

A. No, sir, he has no current, used in the sense of Smith, because he does not have this high velocity. You asked me this morning about the difference between 165 feet per [fol. 626] minute and 140 feet per minute and you did not wait for the answer. I have not talked with anybody about it but my opinion would be that the effect of that velocity would be felt, as pointed out in my examination.

Q. You pointed out in the James Way you had the speed of the air higher than that and had no detrimental effects as far as hatching was concerned, due to that high velocity?

A. "And of sufficient velocity to circulate, diffuse, and maintain air throughout the chamber at substantially the same temperature". The temperature throughout the James Way and, I believe in the Smith is changeable due to giving up and the receiving of heat. In the Smith machine there is a definite trend that temperature, whereas in the James there is a fluctuation back and forth. That there is much of a variation in temperature I doubt. I think in most machines the temperature is very much the same whereby the air will be vitalized", as I said I do not know what that means, I know what the word "vitalized" means but in this patent I don't understand it. "Moisture conservation", I do not think James conserves moisture, in that the heat removed by the moisture, as I recall it, is about twice as much as in the James as in the Smith per thousand eggs per day and "units of heat will be carried from the eggs in the more advanced stage to the eggs in the less advanced stage". I do not feel we have the more ad-

vanced stage, as the more advanced stage is separated and put into an independent structure and I think because of the heat being delivered through the outlet and into the water [fol. 627] pans, that we cannot say that all of the heat which is given out by the hotter eggs is given back to the colder ones, so there is nothing in my opinion that is true in Claim 1 in the James patent, outside of the closeness of the temperature.

Q. Outside of what?

A. The substantially same temperature, I do not believe in either of them there is much variation.

Q. Now, that claim distinctly does not call for a process of incubating and hatching eggs, does it?

A. No, sir, it says "the method of hatching".

Mr. Powers: May I be heard on that objection?

The Court: Certainly.

Mr. Powers: I think Counsel justified the examination a while back on the grounds that during the direct examination it had been brought out that the Smith machine had a corridor and that the James machine did not. That, of course, is a question of fact. Now, the applicability of the claim to those facts is for the Court, and I want to submit, in spite of the fact that there has been a ruling on the question, I do not believe it is quite clear that the development of those facts does not justify an examination of this witness on the claim which is essentially for the Court and a matter of argument and I think while we are on that subject it will be pertinent for me to refer to cases in this circuit, our Circuit Court of Appeals. I want to direct your attention to Kohn vs. Eimer, 265 Fed. Rep. page 902; by [fol. 628] Judge Learned Hand, who said: "We have not the slightest wish to minimize the vital importance of expert testimony in patent suits, or to suggest that we are not absolutely dependent upon it within its proper scope; but that scope is often misapprehended, as the appellant has misapprehended it here. Specifications are written to those skilled in the art, among whom judges are not. It therefore becomes necessary, when the terminology of the art is not comprehensible to a lay person, that so much of it as is used in the specifications should be translated into colloquial language; in short, that the Judge should understand what the specifications say. This is the *only permissible use of expert testimony which we recognize.* When

the judge has understood the specifications, he cannot avoid the responsibility of deciding himself all questions of infringement and anticipation, *and the testimony of experts upon these issues is inevitably a burdensome impertinence.*"

Of course, that is a specific rule, as your Honor probably knows in effect in the Southern and Eastern districts against asking the experts questions concerning the claims, the interpretation of the claims, and Judge Mayer, the late Judge Mayer, discussing that practice, in another case, in the Second Court of Appeals, Victor Talking Machine Company vs. Sonora Phonograph Corporation, 221 Fed. Rep. 677, said:

[fol. 629] "This rule was adopted in order to confine experts to explanations which would be helpful and instructive to the Court in enabling it to understand the art. Whether the patent is valid and/or infringed are questions for the court, and one of the objects of the rule was to reduce the testimony of an expert to its proper and useful limits, instead of permitting it to be an extended argument with a jurat at the end."

I submit, in view of the expression of our Court of Appeals, it is not proper for the witness to be asked whether the claim includes that or does not include that.

The Court: Let me see those questions put to the witness, in writing, the summation you had a few minutes ago.

Mr. Ely: I call your Honor's attention before you look at that, to the extensive series of questions asked the witness on direct examination on this claim, and he was asked to read the claim and give his answer as to whether they were claims, for instance, on Page 121 of the record, the witness said, am reading from page 111, as you remember, a very large number of questions were asked on direct examination as to the claims.

The Court: My theory of the ruling was based on my belief that the foundation had been laid by inquiry made on direct examination. It is very true, of course, the Court has to determine the application of the testimony of experts [fol. 630] and apply the claim or interpret the claim, that is very true, but I would think that here in this case the witness has been asked pro and con in substance, the meaning of these features of these various claims and I think that for the enlightenment of the Court, I do not know

whether it is competent as cross-examination, but for the enlightenment of the Court is ought to be permitted under these circumstances. Let us see what your question is, Mr. Ely.

(Stenographer then repeated the question as follows:

"Q. Now, that claim distinctly does not call for a process of incubating and hatching eggs, does it?

"A. No, sir, it says the method of hatching.")

The Court: I do not think it is necessary to go into the specific language of the claim because the Court can do that.

Mr. Ely: It is merely a foundation for what is to come.

Q. That is to say, in your understanding of that claim it is limited to the process of hatching eggs?

A. The patent specifications, Mr. Ely, distinctly differentiate between the two actions; he does call the early part "stages of incubation" and then he speaks of "hatching in the lower three trays".

Q. Yes.

A. And in that sense I think that this should refer to the latter part. Now, of course, since there is only one type of egg in that hatching compartment, and it is all of the same nature, exothermic, of course, the rest of it could not be read in there, but it does, to my mind, distinctly require [fol. 631] hatching, as I can see it here.

Q. That is to say, the eggs, in the Smith machine, which are hatching, in your narrow meaning of the word——

A. Yes, sir.

Q. Are the eggs which are in those lower three trays?

A. In the Smith reading of the word, as I take it, not mine.

Q. Are the eggs in those lower three trays?

A. Yes, sir.

Q. And eggs which are aboye those lower three trays are what you term as "incubating"?

A. Not what I term but what he terms it. I would like to read it to you.

Q. What do you understand to be incubating eggs?

A. What these words in this specification say, not what I say, "A series of stationary racks", I am reading from page 1, line 81, "A series of stationary racks 12 are also arranged beneath the tilting racks 10, and all of the said racks are of open construction and of the same size to per-

mit interchange of the shallow trays 13 for the eggs to be hatched." Now, a little further over he says, on page 1, line 48, "It is manifest that the temperature will remain practically the same throughout the column of eggs, but the air is impelled with sufficient velocity to carry the heat away from the eggs which happens to be in the advanced stage of incubation". He is now speaking about the egg trays in the lower 3, in the racks which are surrounded by the fabrics. Then, on page 2 he says, beginning at line 79, "It, therefore, appears that the improved apparatus and method contemplates the application of hot air circulating [fol. 632] in a column with such speed as to keep the temperature substantially uniform and so arranging the eggs that the fresh eggs are placed at one point in the column of air and held in a horizontal plane until they reach a predetermined stage of incubation and then put at a different point in the same column of air and kept in planes inclined to the horizontal, and thereafter placed at such a point in the column of air, that the forced draft of air acts to hold the eggs at a uniform temperature and to prevent them from becoming overheated, and thereafter placing the eggs into final position for the hatching operation".

Q. I have heard you read that phrase three or four times.

A. He there distinguishes between incubation and hatching, and I am not using Greene's words, but Smith's words.

Q. That is to say, it is your understanding in this language that the eggs above those lowermost three trays are not hatching?

A. I would not say my understanding, I would say Smith's understanding, as I understand his words.

Q. As you understand the disclosure of the patent, those eggs in the trays up above the lowermost three trays are not hatching according to his disclosure; then we must consider at this minute—we must consider Smith is hatching in the narrow term you have used it, Smith is hatching only the eggs that are in the lower three trays?

A. That is everything being hatched, you mean this last period, and moving the eggs down properly.

Q. And if you do not mean that, then the James Way is [fol. 633] hatching eggs?

A. No, for any meaning of "hatching" James Way is not hatching because the word "hatching" as given in the Court in testimony which I have heard, refers particularly to a particular period during which the chick has developed so

far that it begins to try to break through, and I think that Mr. Smith is speaking of that period also as the hatching period so that I think the hatching is not practiced, whatsoever, by the Smith language, or by the language as given by Dr. Hutt at all; that is, James does not practice that, he puts it in a separate construction.

Q. Unfortunately, you were not here to hear the testimony of the witness for the James Manufacturing Company that said the word "hatching" had a loose meaning?

A. I do not deny that is so, I believe it.

Q. Now, did you understand and state in accordance with the Smith patent there, when he is talking about hatching eggs, he is talking about eggs in those lower three trays only?

A. I don't know, you see, the word "hatching" in English is used loosely. We have to go to this specification to understand it, and the hatching, as he speaks of it, is the method of hatching by bringing the eggs up into this condition of hatching, by the way in which he specifies it in Claim 1.

Q. Now, those eggs that are in the lowermost trays, and which you say, in accordance with the Smith patent, are eggs which are hatching, are eggs all of one age, are they not?

A. That is correct.

Q. And also are not moved at any time or shifted in [fol. 634] column while they are undergoing the hatching process, if hatching means simply the last three days?

A. That is correct.

Q. I see you have recognized the difficulty in construing the claim in the way you would have it. Now, the claim says that the heat must be transferred from eggs in the later stage of incubation to those of the earlier stage, does it not?

A. Yes, it does.

Q. And therefore the eggs which are referred to must be in more than one stage of incubation in order for that to take place?

A. Yes, that is true.

Q. And in your connotation of the words "in different levels" that means that the eggs must be moved while this process is being carried on?

A. Yes, the complete process he speaks of.

Q. Yes, the eggs, which are hatching in your narrow definition of the words, are never moved, in that they are shifted in the column?

A. Yes, they have been moved into the position.

Q. They are not moved while they are there?

A. No.

Q. While they are undergoing this last three days, which you say is the hatching operation, they are not moved to different levels in your connotation of the words?

A. They are not moved or are any others moved, moreover these are the hottest eggs, they give off one hundred and sixty per cent. of the heat from the first 18 days, and Mr. Smith is trying to use that.

Q. Before you get me off on that point, I want you to bring this point home. The eggs which are hatching, in the narrow form of the term which you use, those eggs are all of one age?

A. Yes, sir.

[fol. 635] Q. There is, therefore, from those eggs no transfer of heat from eggs in the more advanced stage of incubation to eggs in the less advanced stage of incubation?

A. I don't know about that.

Q. If they are all of the same age, there necessarily can be no transfer of heat amongst those eggs?

A. That is true.

Q. Those eggs are not shifted in the column while in the last three trays?

A. That is true.

Q. Let us get to this matter of hotter eggs; that claim does not say the eggs in the most advanced stage of incubation, does it?

A. No.

Q. It says in the more advanced stage?

A. That is right.

Q. Do you find language similar to that in the specification of the patent?

A. Let us have that specification, please.

Q. Have you not got the specification of the Smith patent?

(Preceding questions and answers read as follows:

"Q. Let us get to this matter of hotter eggs; that claim does not say the eggs in the most advanced stage of incubation, does it?

"A. No.

"Q. It says the more advanced stage?

"A. That is right.

"Q. Do you find language similar to that in the specification of the patent?

"A. Let us have that specification, please.

"Q. Have you not got the specification of the Smith patent?")

Q. You have got the questions, have you Doctor?

A. I think so.

[fol. 636] Q. I think I can shorten your labors?

A. The specification on page one, beginning at line eight states, "the improved apparatus and method is particularly designed for extensive operations wherein a chamber of large dimensions is adopted to contain thousands of eggs in separate trays, arranged in tiers, and the method of heating is such that the heated air is adopted to the eggs in the various stages of incubation. There is a forced——"

Q. Pardon me, I did not ask you to read the whole specification of the patent. I asked you to find in the patent a phrase the same or similar to "eggs in the more advanced stage of incubation", I did not ask you to read the whole specification of the patent; I asked you to point out language in the specification of the patent that was the same or similar to that. The claim which you are reading is a——

A. I was not reading the whole claim, I was reading the one phrase. I cannot find that phrase.

The Court: I do not think it necessary to spend much time on that.

Q. Will you read, for example, the last two lines of column two, page two of the patent?

A. I am reading from page two, breaking into the sentence at the end of line 63. "As heretofore referred to, and as the eggs further advanced in incubation are contained in these lower trays——"

Q. Now, just a moment. Will you stop there for a minute. What eggs in what trays is he there talking about?

[fol. 637] A. He is talking about the trays which are in the lower part of the tilted racks and surrounded by the fabric.

Q. And those are the eggs which are from 15 to 16 days of age?

A. That is right.

Q. And the language of the patent where it says "eggs further advanced in incubation", refers to the eggs from 15 to 18 days of age, is not that so?

A. I am not sure of that.

Q. At that point it is——

A. If this statement which you make is right, your answer is right.

The Court: Why do you say that does not apply to those in the last three days?

Mr. Ely: Well, your Honor, I say the language of the claim says "the eggs in the more advanced stage of incubation" and they are reading that language as "eggs in the most advanced stage" and I am calling your Honor's attention to the fact that the only point at which the phrase "more advanced stage" or "similar advanced stage" refers to eggs 15 to 18 days old, which are exactly of the age of eggs in the James Way machine.

The Court: Why does that language limit it to those last three days period rather than to the eggs from 17½ to 21 days?

Mr. Ely: It does not make any difference. The language of the claim is broad enough to cover a more advanced stage. The language does not say "the most advanced stage in the incubation".

The Court: I understood you to say it applied to the [fol. 638] James machine because it applied to the last stage or 17½ to 21 days. I do not think we ought to pursue this examination at unnecessary lengths. I think most of this is for the Court, unless there is some question to be brought up in cross examination. The construction has to be placed on the claim by the Court. Now, of course, what my theory was was that this door had been opened by the examination already had.

Mr. Ely: I will not pursue that question further if I have made the point clear.

Q. I understand you to say in the James Way incubator you do not have a restricted opening leading from the egg chamber?

A. I said, or should have said that we do not have a closed chamber having a restricted opening of such capac-

ity for the escape of foul air without undue loss of moisture, that is, I stated that the closed chamber does not have the restrcted opening in it.

Q. Now, in the James Way incubator, the opening for the discharge of foul air is in the upper left-hand corner of the machine, is it not?

A. I would like to mark this "A" (Referring to Plaintiff's Exhibit No. 14).

Q. "A" on Plaintiff's Exhibit 14?

A. 14, at the upper left-hand corner.

Q. Now, the air from the egg chamber passes up through openings at the top and bottom of the fan housing, so-called, does it not?

A. That, it does.

Q. Then, that air passes through the fan housing and [fol. 639] part of it comes through "A"?

A. That is correct.

Q. And therefore the foul air from the egg chamber, whatever portion of the foul air which is exhausted from the machine, comes from the egg chamber and passes through the casing and out through the opening "A".

A. That is correct, just as I leave this building and go out the front door, but the front door is not part of this room.

Q. However, the front door is a means for your getting out of the building?

A. Yes, sir.

Q. Your hole "A" is the means for getting foul air out that is in the egg chamber?

A. That is correct, and is not in the egg chamber, and is a different pressure, as pointed out the opening is in a super-atmospheric region and the egg chamber is a sub-atmospheric region, and you cannot have two regions in the same chamber.

Q. And speaking of the James Way machine, that opening "A" performs the same function as the opening in the Smith machine, in that it lets out foul air from the egg chamber, to get it out of the cabinet?

A. Just as the same way as this door serves the same function as the front door of this building, but the front door is not in this room.

Q. That opening in the James Way incubator performs the same function as the opening in the Smith because they both let foul air out.

A. It is open, which serves to let foul air out, as the front door does to allow persons to get in and out, they cannot get in and out without going through that front door; it serves the purpose of letting people go through.

[fol. 640] Q. And this serves the purpose of letting a certain amount of foul air out?

A. Yes, sir.

Q. And equally to the matter of conservation of moisture in the James Way machine——

A. Yes, sir.

Q. We had quite an illuminating discussion about that yesterday; you were not here but I want to know if you subscribe to what some of the James Way witnesses said yesterday, as a matter of fact the matter of moisture conservation is a mattter of how much air goes through the machine because the air, as it goes through the machine, will carry moisture out?

A. That is not true.

Q. Will not the air, as it goes through the machine, carry moisture out of the machine?

A. It will.

Q. And if you reduce the amount of air going out of the machine, will you not reduce the amount of moisture going out of the machine?

A. No, that is not true. If you went out of the door with your associates, you might carry much more money than I have in my pocket, one man might carry five times more money. We have to consider the quantity and condition of that air.

Q. That is to say, moisture is diffused through the air?

A Yes, sir.

Q. It is eventually diffused through the air in this arrangement?

A. Yes, sir.

Q. And the less air goes out of the machine the less percentage of moisture will go out of the machine?

A. In that machine, yes, sir.

Q. I think we have already discussed this matter of heat transfer probably ad nauseum, so I will not go into [fol. 641] that any more. Now, would you say that the James Way incubator has a forced current of air?

A. It depends on how you define the word "forced".

Q. That is to say——

A. It is a current of air which is moved. It is moved by an inefficient impeller. There is 500 cubic feet, according to Mr. Taggart, approximately that goes through there per hour, and it is passing through there by two instrumentalities, the impeller at the top and the stirrer, which straightens out the discharge.

Q. And it is a forced current of air in that it is a current created by means other than gravity?

A. If you define a forced current that way, yes; I would call it a circuit, if you do not mind, because a current has a particular connotation in this case.

Q. The only difference, as I understand it, between, you, yourself and myself on that matter is whether that current of air is pulled through the egg incubator or whether it is forced through the eggs from a pressure behind, is that right?

A. I do not see how there can be any difference in opinion if we determine on what is an induced draft as, I think, Mr. Taggart mentioned in his examination. I may be wrong about this, but according to the Buffalo Forge Company Fan Book, which you showed me this morning—I have the old edition of that, and it very nicely says, in agreement with what I have said, that we speak normally of an induced draft when we have a sub-atmospheric condition and where the fan sucks the substance and we have a forced draft when we have a super-atmospheric condition or where the fan is pushing. Now, there is always a flow [fol. 642] when there is a difference in pressure and pressure difference is the thing that causes the flow, but in one of these machines we do have this so-called flow due to induced draft and in the other machine a flow due to the so-called forced draft. In one there was a pressure above atmosphere, not very great, and in the other one, a pressure below atmosphere.

Q. And that flow of air is produced by a power instrumentality, whether you call it a fan or do not call it a fan, is that not so, and whether that thing in the James Way incubator is a fan or not, in the strict definition of the word, it nevertheless creates that current of air through the machines, does it not?

A. Yes, you distinctly measure that with the suction around the eye of the impeller.

Q. That is to say, it does the same thing as in the Smith?

A. If by the same thing, you mean——

Q. It produces a current of air.

A. It produces motion of air.

Q. Now, in the James Way incubator, in the egg chamber the air is moving substantially as shown in Mr. Taggart's chart, is it not?

A. We will assume that.

Q. There was not any point, or, have you been able to observe any point in that air movement when we get above the first or second tray, say, have you been able to observe any point in which the air is moving first in one direction and then in the other, that is, fluctuating?

A. No, because, if there were such motion, I am not saying there were such motion, his anemometer would read [fol. 643] back and forward, and the result would be the net effect.

Q. Now, it may be that the differences in reading which he found due to the very thing you mentioned, namely the up and down motion?

A. I do not say it is, but it might be that; an anemometer is a machine, which if you blow air one way, it turns to the right hand and if you blow the other way, it turns to the left-hand. If during the minute there were net changes up and down, you would interrogate the net effect during that minute.

Q. You have had an anemometer in the James Way?

A. Yes, but I never noticed that.

Q. As far as you were able to determine the air was moving in a continuous movement through the machine?

A. A continuous but——

Q. It might be changed in one lane?

A. It might be changed as Mr. Taggart's reading showed. If you take anemometer readings, you will find a decrease and increase which means there must be a swelling out of that lane or strata and a closing up in the interim; that can only occur if there is a fluctuation or cross motion set up.

Q. You would not expect to find in the Smith machine a change in the movement of air?

A. Only because in the Smith machine the eggs fill up the large space in large numbers, but in general it even ought to be the same.

Q. This increase in speed, we talked about, in the upper corner of the James Way machine, was due to the fact

the current of air was going to those two openings, one at one side and one at the other, into the fan chamber?

A. Into the impeller eye.

[fol. 644] Q. I beg your pardon, into the impeller eye, and as I understand it, in most currents of air there is turbulence, is not that so, in most currents of air there is turbulence—any currents of air that are appreciable?

A. I think so, I think most of the testimony shows there was a certain amount of turbulence throughout the chamber.

Q. That would be true in both the Smith and James?

A. I think that would be true in the corridor of the James, where you are deflecting a large amount of air into a larger area, not so much after you turn the corner and go up, because there are not so many eggs as in the Smith.

Q. If there is any turbulence, it is possibly a little more turbulent in the James than in the Smith?

A. No, in the James, because we do not have the high velocity, and in low velocity it would persist longer than in high velocity.

Q. When you get air moving above critical velocity you will always find turbulence?

A. Yes, sir.

Q. And critical velocity is much lower than the velocity we have in either the Smith or James?

A. I have not figured it, the complete figure.

Q. There is no difference in the turbulence, except some slight degree?

A. Some arrangement of traps and organization of parts.

Q. Just one or two questions, Dr. Greene. I noted, when you were making your tests down at the warehouse, at the James Way warehouse, the other day, that when the ma-

[fol. 645] chine was filled with smoke and you wanted to clear the machine out, you opened the door and the smoke blew all out; that is right, is it not?

A. Yes, sir.

Mr. Ely: That is all, your Honor.

The Court: If you have any further inspection of this machine, you will have to have some examination, I suppose, following that?

Mr. Toulmin, Jr.: Yes.

The Court: I think we might as well suspend at this time.

Mr. Toulmin, Jr.: When does your Honor suggest we might have this inspection?

The Court: Mr. Taggart and Dr. Greene can go there, can they not?

Mr. Toulmin, Jr.: They can go there tonight; so they can get away.

Mr. Ely: What do you want to do? I did not hear.

Mr. Toulmin, Jr.: Go over and see the Smith machine with our nice 47,000 eggs, or whatever it is, and you can take Taggart along, and we will take Dr. Greene, and we can, the four of us, go in there and settle between these people exactly what the speed of air is between that and the Smith machine.

Mr. Ely: I do not think it makes enough difference, but if you want to, go ahead.

Mr. Toulmin, Jr.: You thought there was enough difference at Frenchtown.

The Court: What kind of fan?

Mr. Toulmin, Jr.: We have the same kind of fan that [fol. 646] was in the machine—we will call Mr. Corey, who has had the machine ever since he bought it three years or six years. I have Mr. Corey right here; I can call him and put him on.

Mr. Ely: I understand that these fans that are in that machine of yours are standard Smith fans that were used in the machine that was put out at the time that that machine was put out.

Mr. Toulmin, Jr.: They are the fans that came with the machine.

The Court: The old fans?

Mr. Toulmin, Jr.: The old fans, that is right.

Mr. Ely: The old fan goes up, as I understand it, to this year.

The Court: I mean, the earlier fan.

Mr. Ely: Well, it is earlier than January of this year.

Mr. Toulmin, Jr.: Yes; it is the fan which has been used for years and years.

The Court: You have spoken of two types of fans.

Mr. Toulmin, Jr.: This is the so-called old type of fan.

Mr. Ely: The fan which has been used the last 20 years, or 15 years.

The Court: You can make your arrangements about that, probably. We will adjourn until tomorrow morning at 10:00 o'cloock.

(Proceedings adjourned until tomorrow morning, February 9, 1934, 10:00 o'clock.)

[fol. 647] Redirect examination.

By Mr. Toulmin, Jr.:

Q. Dr. Greene, last evening, at eight o'clock, we went to the store-room of the James Company where the Smith machine, produced by the James Company, was located, did we not?

A. We did.

Q. You attended that meeting and the subsequent tests?

A. I did.

Q. Did Mr. Shodron attend it?

A. Mr. Shodron attended

Q. And Messrs. Ely, Taggart and McConnaughey?

A. Yes, sir.

Q. And this gentleman whose name I do not know, the engineer.

Mr. Ely: Mr. Madison.

Q. Who went in and took the tests inside the machine?

A. Well, Mr. Shodron and I went in and Mr. Taggart was there all the time we were there and Mr. Ely came in occasionally.

Q. And I came in occasionally?

A. Yes, sir.

Q. Was the machine of Smith filled with eggs?

A. It was filled with a number of eggs which we did not count exactly, but they appeared, all trays appeared to be filled. There was some comment made that the trays were not as closely packed as Smith, in his practice, packs them. This, of course, would give a little more air space, but they were substantially filled, and when we went in there, your Honor, there was a cellophane or isinglass arrangement in an extra curtain on one side, which was about the fourth clear space from the back. We then opened the

[fol. 648] curtain by sliding it along on each side so Mr. Taggart could see all the trays were substantially filled with eggs, and when we got through, on the right-hand side, looking into the machine, the isinglass appeared to be between the fourth and fifth tiers of eggs, and it was at that place we made our test. That just happened to be a place at which it was done; any place would have done; but it was at that place we made the tests, after bringing the curtains back into their normal working condition.

Q. What is the capacity of this machine that was filled with eggs?

A. It is a so-called 52,000 machine. I figured the egg capacity at 144 eggs per tray, which becomes 47,000. Mr. Taggart, in his testimony, regarding a similar machine, said it might be between—I think he said, forty-seven and fifty-two thousand. The normal size, the name of it is a 52,000 machine.

Mr. Toulmin: I think it is agreed between Mr. Ely and myself we had 47,000 eggs over there.

Mr. Ely: It is a 47,000 machine you had over there.

Mr. Toulmin, Jr.: It is also agreed it is a standard Smith machine, is that correct, Mr. Ely?

Mr. Ely: Yes.

Q. Dr. Greene, did you offer to make any other tests for these gentlemen or offer that they could make tests they pleased when you were over there?

A. Yes, after we made the test at a point practically one [fol. 649] and a half trays from the top of the tray column, and another one about one and a half trays from the bottom of the column, should the trays be placed in a horizontal position, we asked if they wanted any more and they said, "It is your test, whatever you want to do."

Q. Did you make any test as to the amount of linear feet of air being delivered by those fans in there?

A. The only way in which the velocity, which was obtained from any tests in the vertical passage, could be determined, would be to determine, as well as you could with instruments available the discharge from the fan, so, after making the tests in the vertical passageway, we made measurements on the velocity of discharge from the fan by putting the anemometer near the outlet, probably an inch and a half away, and in three of these machines we

traversed the anemometer back and forth to get the average reading; in another one of the machines we took three different readings and averaged them. In addition, when we entered the cabinet, each one of the fans was dropped down so it could be examined and Mr. Taggart and Mr. Shodron both looked at the number on the fan, which corresponded to the manufacturer's numbers used by the Smith machine, and then we put the machines in the operating position and determined the revolutions. In most of this work, Mr. Taggart held the watch and he fixed it so we could see it and then the ticometer, not the ticometer or anemometer was observed by Mr. Shodron and Mr. Taggart and I think that there was agreement on all sides that we were attempting to get correct readings. There was no objec- [fol. 650] tion made to any entry that was made and there was no discussion about correctness or incorrectness. On fan No. 2, from the front, knowing that was going at a higher speed than others, when we got one particular reading by traversing, we realized there must have been something the matter and for that one we took these individual readings to average them up.

Q. The individual readings of other fans——

A. I beg your pardon.

Q. The individual readings of this one particular fan.

A. Instead of using the traversing number which was low and we all realized something was the matter; we took individual readings and averaged those. We endeavored to space the anemometer so that the average reading might be considered the average result of velocity.

Q. And what result did you get as to the average linear feet delivered by the fans in that machine?

A. The readings of the anemometer, when corrected by the calibration curve, gave for the average of the four fans 749 feet per minute.

Q. Now, what do you mean by the correction for the calibration curve? Explain that to the Court in connection with an anemometer and why you have to do that.

A. Your Honor, the anemometer which we used is of a small size, which you inquired about during the testimony of Mr. Taggart. I believe you asked if there were not smaller anemometers, when you saw the ones we used, and this is a small anemometer bought so that it could be in-

troduced and shifted along the opening between the trays [fol. 651] in that passageway of the Smith Patent without difficulty. The larger machine, the larger anemometer would have to be placed in position and taken out and moved by hand. This, we thought, would be used this way. We planned to move it this way and traverse the section and get the average. Mr. Taggart did not think that was the proper thing to do so we put this device two or three inches from the front, near the center of the egg chamber, and at the back wall. In all anemometers you have air passing through all inclined veins. Due to the friction of the machine, the bearings and little gears, the passage affected is larger at low speeds than at high speeds so the manufacturer or the user, and, of course, it should be done, the user should calibratae his machine, if he is equipped to do so, and he gets a calibration sheet. In this one——

Q. Where does he get that calibration sheet from?

A. The calibration sheet comes from the Taylor Instrument Company, Rochester, who makes the anemometer, and this is for anemometer 2127, which is the one before the Court, and the statement is that at 200 feet per minute plus 31 is the correction which should be added to the reading of the anemometer to get the correct speed. At 300 feet it is plus 22; at 400 feet it is plus 14; at 500 feet per minute it is plus 6; at 600 feet it is minus 2; at 700 feet it is minus 10; at 800 feet it is minus 18; at 900 feet it is minus 26 and 1,000 feet per minute it is minus 34. This calibration sheet runs, therefore, from 200 feet per minute reading on the anemometer to 1,000 feet, and at the bot- [fol. 652] tom, the instructions say where the plus sign is used that must be added to the reading of the anemometer and when the minus sign is used it must be deducted.

The Court: What do you say is the cause of that difference?

The Witness: It is due, primarily, your Honor, to the fact that there is a slip in the air going across those vanes; also there is a certain amount of friction if you take, for instance, the air turning the propeller, the airplane does not move as fast as the wind moves through the propeller and there is a certain amount of slip over those blades in this machine. You are trying to get rid of all friction so the air will move without any slip but since there is a slip,

and the air has to move over there with energy to move this, therefore, the effect of friction gives you a calibration curve which has to be used. Now, we have brought the point given here——

Q. What do you mean by the point given here?

A. We have brought the result, the point given on the chart of the Taylor Company.

Q. Your correction chart?

A. The correction chart, on cross-section paper, to enable you to get the correction for intermediate points between the hundreds.

The Court: I do not think it is necessary to go into that. I do not think there is a question here of calibration differ- [fol. 653] ences. It is interesting and valuable information but at the same time it is not helpful.

Mr. Toulmin, Jr.: I agree with the Court.

Mr. Ely: That is near enough.

Mr. Toulmin: That is all on that question. Let us go to the next one.

The Court: It makes too big a record.

Mr. Toulmin, Jr.: Yes, I want to get through with this. If we can agree on things, it is much better.

Q. Now, Dr. Greene, what result did you get in your readings in the egg column of the Smith machine that was tested last night with the eggs in it, over in the warehouse?

The Court: I understood you first to say you made the tests only at the fourth layer.

A. We made the test at two layers, one and a half from the top and then went one and a half from the bottom of the tilting egg column.

The Court: You mean trays?

A. Yes, one and a half trays from the bottom.

The Court: What did you mean by saying about the middle?

The Witness: That is in height. Now, in going in between the trays we took one reading near the curtain, one near the [fol. 654] rear wall and a third one half way between the wall and curtain. I can show on the——

Q. If you will take Exhibit 11-A and point out to the Court the different transverse and vertical positions.

A. Your Honor, we went—I will mark about one and one-half trays from the top, near the curtain near the middle and near the wall and then we went to about one and one-half trays from the bottom of the tilting column and did the same thing.

Q. And the purpose of that, Dr. Greene, was to get an average, is that correct?

A. That is correct.

Q. Read to the Court, briefly, the figures you got at the several points so that we will have a record of them.

A. In the upper portion near the front we got 152 feet per minute; in the middle position at this height we got 150 feet per minute, and all the way in 159 feet per minute. The average of those three is 153.7 feet per minute. We then went to a point near the bottom of the egg column and made three determinations, getting 85 feet per minute near the curtain; 153 feet per minute near the middle of the egg column and 154 feet per minute at the back; the average of these three is 130.7 feet per minute linear speed. The average of the two averages is 142.2 feet per minute of linear speed of air in the passageway between the third and fourth egg columns.

Q. And that is on the basis of 749 linear feet per minute, coming from the fan, is that correct?

[fol. 655] A. Yes. Might I correct that; it is the fourth and fifth egg columns, not the third and fourth.

Q. And that is on the basis of that Smith machine having 749 linear feet delivered from the fans?

A. Yes, sir.

The Court: And allowing for calibration.

The Witness: Allowing for calibration curves; those are all corrected.

Q. It is the customary practice to calibrate these instruments, is it not?

A. Yes, indeed.

Q. Now, Dr. Greene, you remember Mr. Taggart's testimony on Plaintiff's Exhibits A, B and C?

A. Yes, sir.

Q. You further remember that he testified that there were from forty-seven to fifty-two thousand eggs in the machine

and that was a 1200 linear feet per minute air delivery in that particular machine, that he testified?

A. Yes, sir.

Q. What is the average speed indicated on Exhibit 11-A, B and C, that Mr. Taggart got in the egg column?

A. As I remember the average of these various speeds, taking them in the tilting egg trays, it comes to 73 feet per minute.

Q. Now, have you made a calculation to bring the performance of the Smith machine, we saw last night, to the same comparable basis to Exhibit 11-A, B and C, by figuring the 1200 feet per minute in the Smith machine the defendant has produced, instead of 749 linear feet?

A. I have.

[fol. 656] Q. So there will be a comparsion between Exhibit 11-A, B and C and the tests you made last night?

A. I have made such calculations.

Mr. Ely: I do not see why we need to go into that. We went over there last night and they get a test, I do not see that it is necessary.

Mr. Toulmin, Jr.: This is vital to our interests to show this machine——

The Court: He should be permitted to show that if that was the basis of Mr. Taggart's testimony that the fan was 1200 feet.

Mr. Toulmin, Jr.: The Court will find it at page 312 of the record.

The Court: The factor is what stage of incubation these eggs were in.

Mr. Toulmin, Jr.: There is no point between the parties as to the stage of incubation.

Mr. Ely: I do not think the temperature of the eggs makes a bit of different in the speed of air currents, it is so very slight it is very negligible.

Q. Proceed.

A. I made such calculation to get a ratio and my result comes out 228 feet per minute were the fan delivering air at a speed of 1200 feet per minute.

Q. That is, if the test with eggs in the Taggart Exhibit 11-A, B and C had been properly conducted, from your point of view, the result, instead of being 73 feet per minute, in the egg column, should have been 228 feet, is that correct?

[fol. 657] A. From my figures that is the way it comes out.

Q. Is that in harmony with your statement to the Court as to the physical condition necessitating such a condition when you put eggs in the path of air?

A. Yes, it is 3.11 times the average, and I said it was three or four, I believe.

Q. Are these figures on this piece of paper correct, according to your check?

A. They are.

Mr. Toulmin, Jr.: Defendants' counsel then offered in evidence a sheet of paper containing comparative figures between Plaintiff's Exhibit 11-A, B and C, and the Smith machine produced in Defendants' warehouse and it was admitted as Defendants' Exhibit No. 75.

Q. Dr. Greene, yesterday there was considerable cross-examination of you on the question of the Smith machine being a pressure machine in the egg chamber, and the James machine being a suction machine. You recall that examination?

A. I do.

Q. Questions were asked you as to the elevation of the respective machines changing the pressure and suction conditions, is that correct?

A. That is correct.

Q. And you were asked about lifting them, say, two feet off the floor?

A. Yes.

Q. I want to know from you as to the Smith machine, whether, if you change its elevation, it makes any difference as to its being a pressure machine. That is, do you change it from a pressure machine to a suction machine by chang-
[fol. 658] ing its elevation?

A. Oh, no. The machine is always working relative to the atmosphere which is around it, and in order to get air out at a velocity of 160 feet per minute, as Mr. Taggart says in 11-A into an atmosphere which is also bringing air into the suction chamber directly over the fan at 180 feet per minute, you must have pressure of the atmosphere in this machine throughout the whole egg tray.

Q. And as to that Smith machine, would it operate, unless it is a pressure machine, irrespective of its elevation?

A. Oh, no, it would have to be a pressure machine.

Q. Now, as to the James machine, some question was raised here as to whether the James machine would be changed from being a suction machine by changing its elevation; is that correct, that you would change it?

A. It is not correct that you would change it. It would still stay a sub-atmospheric machine, for the simple reason that we have in the base around the stirrer, a place connected to the atmosphere which is probably a little bit below atmosphere, and since the atmosphere is the thing which fixes that pressure within, we must have sub-atmospheric pressure.

The tests made before the Court in the storeroom indicated very clearly that the Smith machine was a pressure machine, and if we put it on top of that building, the same thing would be seen; and the James Way was a suction machine, and we would put that on the roof or down in the cellar and the pressure within the device would be below the atmosphere at that point.

Q. And would the James machine operate as it is now [fol. 659] operating if it was changed from a suction to a pressure machine?

A. No, it could not operate as a pressure machine.

Q. It must inherently be a suction machine, is that correct?

A. Absolutely.

Q. Now, let us go to another point. There was a long cross examination about these heat units. The first question I want to ask you is whether it makes any difference to the egg whether the heat unit that is being applied to it comes from another egg or from a hot water pipe?

A. A heat unit is an amount of energy.

Q. It is a heat unit?

A. It is a heat unit, and whether it comes from a man, or a piece of coal, or petroleum, or gasoline, or an egg, or a hot water pipe, it is a heat unit.

Q. Dr. Smith, in his patent, as I understand it—and I want to verify this, yes or no—by arranging his hottest eggs at the bottom of the column, as explained in his patent, is doing so for the purpose of taking advantage of the egg heat, to add that to the artificial heat, in order to heat the eggs above the hottest eggs, that is, the cooler eggs.

A. That is correct.

Q. And you stated in your cross-examination that if he reversed the position of the eggs in the Smith Patent, he would not get advantage of the egg heat being transmitted to the cold eggs, and the egg heat would go out the outlet openings.

A. That is correct.

The Court: He does not distinguish between egg heat and any other heat.

Mr. Toulmin, Jr.: Yes, that is right.

[fol. 660] The Court: He means the amount of the egg heat that goes out.

Mr. Toulmin, Jr.: I was asking as to the fact of the heat going out. Now I will ask as to the amount.

Q. Now, Dr. Greene, you further stated, in connection with the Smith machine, if it was arranged in this theoretical fashion of having hot eggs at the top instead of at the bottom, that the amount of heat that would make its exit under such theoretical conditions would be greater than the contribution of egg heat to the total sum of heat; is that correct? If not, correct it.

A. I would have to get my figures there. I have an exhibit already prepared which gives those figures, which is in evidence. If I could use that, I think it would——

Q. It is 51, I think.

Mr. Ely: We do not dispute that there is more heat given out than comes from the eggs. We do not dispute that.

Mr. Toulmin, Jr.: All right, let us proceed then.

Mr. Toulmin, Sr.: There is no answer to the last question.

Mr. Toulmin, Jr.: Mr. Ely has admitted it. Let me finish this.

Q. Now, in view of the fact that Mr. Ely has admitted that there is more egg heat goes out, in that theoretical arrangement, from the Smith machine then——

[fol. 661] Mr. Ely: I beg your pardon.

Q. More total heat.

Mr. Ely: I beg your pardon. I did not say that.

Mr. Toulmin, Jr.: Just let me reverse it.

Q. In view of the fact that Mr. Ely has stated that the total amount of heat making its exit from the Smith machine when the eggs are reversed in position——

Mr. Ely: In any position.

Q. —is greater than the amount of heat contributed by the eggs; what would you say as to that theoretical machine practicing the teachings of the Smith Patent?

Mr. Ely: Just a minute. My statement was that, in any arrangement in the Smith machine, more heat goes out of the machine from one source or another than is added by the eggs.

Q. Now, will you answer my question, Dr. Greene?

The Court: Of course, you admit that it is applicable so far as the top layer is concerned.

Mr. Ely: And the same thing occurs as to the hot layers at the bottom.

The Court: I say, you admit as to the heat from the top layers?

[fol. 662] Mr. Ely: My admission was that in either arrangement, you are bound to have more heat go out than given up by the eggs; otherwise your machine would burn up, eventually.

Q. Now, Dr. Greene, that is not true when you practice the Smith invention as taught in the specification of the Smith Patent, is that correct?

A. That is correct.

Q. Now, in the James machine, am I correct in understanding your position to be that the amount of heat contributed by eggs in the James machine is less than the total amount of heat that is discharged from the outlet openings?

A. That is correct.

Cross-examination.

By Mr. Ely:

Q. That is, the difference is between tweedledee and tweedledum; you say less heat is given up by the eggs in both machines than is discharged from various sources.

A. I said that, in the Smith machine, I would have to look at my exhibit to make sure of that answer. In the

James machine, I distinctly said that more heat—I assented to the statement that more heat was delivered through the openings than was received from the egg column.

Q. Well, I know, but it is just the difference of tweedledee and tweedledum; if more heat is delivered through the openings than is given out by the eggs, then less heat is given out by the eggs than is delivered from the opening, and it is just the difference of which way you put it; there [fol. 663] is no difference at all; that is so, is it not?

A. That is, if more is delivered than that which is given, then that which is given is less than that which is delivered.

Q. Exactly so.

A. Sure.

Q. And you said one way was Smith and the other way was the James Way?

A. Yes; same thing.

Q. So there is not a particle of difference?

A. The statement is dead true.

Q. And it applies to both machines equally?

A. I would not say equally, because in the Smith machine you have this last big amount of heat down in the bottom, which is 180 per cent more than the first 18 days; also you have to take care of the moisture.

Q. I understand it is a matter of degree between the two?

A. No, it is a matter of the practice of the patent. Mr. Smith calls for everything——

Q. All right; in both machines, we will assume, and everybody agrees, that more heat goes out of both machines than is added to the machines by heat of the eggs, and we both agree on that, do we not?

Mr. Toulmin, Jr.: That question is confusing, because you say "both machines".

The Court: He can answer; he can say whether that is true.

Mr. Toulmin, Jr.: A distinction ought to be drawn between the Smith machines and the theoretical machine.

The Court: He may state if he does distinguish between that machine and the patent. Is that true, that there is [fol. 664] more heat given out than the accumulated heat from the eggs? That is the question, I suppose.

The Witness: I would have to look at my figures.

The Court: If it comes from that source or is supplied only from the heat of the eggs——

The Witness: Your Honor, my figures are in that Exhibit, and my trouble is here a little difference of 200 B. T. U.'s, I think is in favor of the amount which leaves. and I cannot definitely say.

Q. Well, Doctor, it must be, must it not; it must be, more heat must be given off than is given up by the eggs, otherwise the eggs would give out more and more heat to the machine; then they would eventually burn up, is that not so?

A. You see, in the Smith machine, they provide for refrigeration, and that is the way they take care of any heat—not in the patent, but in the Smith machine which is practicing some of the teachings of the patent, they find the heat is so great that they have to put in a refrigerator.

Q. You understand that refrigeration is only used, however, in Arizona and California, and in the very hot days in the late hatching season, when you have not the differential between outside atmosphere?

A. I hear you say it, and I understand what you say, but it also shows that if more heat is developed than can be cared for by the outlet, you have to absorb it by refrigeration.

Q. Oh, certainly.

[fol. 665] By the Court:

Q. Assuming there is no refrigeration, is it a fact and must it not be a fact that more heat than comes from the eggs must be taken up?

A. That is true, sir; and, your Honor, in discussing the patent, I think I have said at one place—I know I have said it before the trial—that the hot water pipes of the Smith patent, if the eggs are not properly arranged, would have to be cooling pipes in order to give the proper temperature for the lower eggs, if he did not follow his teachings; that is, his teaching is very distinct. The patent will work, as Smith says it works, and it will work properly, and if the heat——

Q. It is very simple and plain; the question is whether there is more air passes——

Mr. Ely: More heat you mean.

Q. More heat, I mean, than accumulated heat from the eggs?

A. Yes, sir, that is true.
Q. In both machines?
A. That is true.

By Mr. Ely:

Q. And you are not a practical incubator man, I understand?
A. I? Oh, no.
Q. And that same thing would be true in the Smith machine if you reversed the order of the eggs?
A. Oh, no.
Q. Would the reversal of the order of the eggs make any difference as to the number of heat units which those eggs give up?
[fol. 666] A. You see, the amount of heat in the Smith machine developed by the eggs is so slight, being only about one third of that in the James machine.
Q. I did not ask you about the James machine. I asked you about the Smith machine. Now, please answer my question.
A. I am trying to. I misunderstood it.

Mr. Toulmin, Jr.: Are you asking about the Smith machine or the Smith patent? There is where this whole confusion arises.

Mr. Ely: I am asking about the Smith machine, or about the machine shown in the Smith patent, if you want to, if the order of the eggs is reversed, does that make any difference whatever in the amount of heat units that are given up by those eggs.

The Court: He means, all together.
Mr. Ely: Yes.

A. No, it doesn't make any difference in the amount of heat given up by the eggs because that is a fixed amount by nature.

Q. Exactly so. Now, you did not understand me to say, by my series of questions yesterday, about this elevation of the incubator from the floor, to, say, two feet, you did not understand me to be driving at the point that that changed the machine, the Smith machine, from a pressure to a suction machine, or James Way from suction to pressure; you did not understand what I was getting at?
A. I did not know what you were getting at, Mr. Ely.

Q. What I was saying yesterday and what I think you [fol. 667] admitted, and I think possibly you have admitted it this morning, is this, the only thing that makes any difference to the eggs is the pressure of the air around the eggs; they do not care whether the pressure in the corridor, or in the channels through which the air came, they do not care whether that pressure is greater or less than the pressure which is surrounding them, do they?

A. No.

Q. Therefore, the eggs do not care whether they are operating in a pressure or suction machine, do they?

A. I don't think they would.

Q. And you can change your pressure around the eggs, in a James Way or in a Smith machine, by simply changing the elevation of this machine about two feet?

A. That is what the figures show.

Q. And therefore, my point was that, while you had a theoretical difference between the two things, as a practical matter it did not make a bit of difference. Now, do you agree with me on that?

A. Is that a question you ask me?

Q. Yes, I asked you if you agreed with me, as a practical matter, it does not make a bit of difference to the hatching of eggs whether you have got a suction condition, as in the James Way, or whether you have a pressure condition as in Smith?

A. I think the difference between the two machines would be very slight, if they were both placed in the same room; one would have a slightly lower pressure than the other, and if it was changed in elevation or if the barometer changed, both of them would go on, the same way, and the change in the barometer might be more than that difference in pressure.

[fol. 668] Q. And if you elevated one a little higher than the other, you would be able to correct the difference in pressure between the two machines?

A. That is right, sir.

Q. That is, if I had one machine on the floor and another machine on the second story, I would really have the conditions of pressure reversed, would I not?

A. It depends on which one you put on the second floor.

Q. I could reverse my conditions of pressure and have less in the Smith than in the James Way?

A. In that condition, you might.

Q. And what I am getting at is, it does not make a particle of difference in the operation of the thing as a hatching machine, this matter of the pressure within the egg chamber in the James as against the Smith; and do you agree with me on that?

A. I think that the variations of the atmospheric pressure is greater than the variation between the two machines.

Q. Now, will you answer my question?

A. And therefore, there may be big variations in the two working under the same conditions, one will be lower than the other and there would be some slight difference.

Q. I wish you would answer my question, please. I am asking you whether as a practical matter, it makes a particle of difference in these machines, as hatching machines for hatching eggs, this condition of pressure and suction that you have been talking about?

A. I do not know as a practical matter.

Q. You do not think it would, either, do you, Doctor?

A. As far as variation is concerned, I have stated over and over again, there is more variation due to the barom- [fol. 669] eter moving than the difference between those two machines, and that is all I can say.

Q. And you frankly do not think it makes a particle of difference; it is simply something that you have gotten up in some way to try to differentiate between the machines, and it does not make a bit of difference in the matter of the process of hatching eggs?

A. It is quite a difference, because in one machine, it necessitates—I am talking about practical reasons, not on the eggs, but in the machine, it makes all the difference in the world because it enables James to locate his outlet at a different point.

Q. Yes, exactly so.

A. And, therefore, that is a practical difference.

Q. And if he located his outlet at a different point from the outlet of Smith, it does not make a bit of difference to the eggs whether the air comes in at the bottom and comes in from suction or whether it goes out at the top from pressure; it does not make a bit of difference; we are talking about practical things; it does not make a bit of difference to the eggs does it?

A. I would not want to say that.

Q. Well, I think it is perfectly evident that it does not. Now, with regard to those tests that we made last night,

you understand, do you not, or at least I so understood it, that that machine that we tested last night was a standard Smith machine that had been in use for quite some time by some one by the name of Corey?

A. Yes, sir.

Q. And that in the condition in which it had been used [fol. 670] in the hatching of eggs?

A. That is my understanding.

Q. And that no changes had been made in it since it was brought into your place; it was the machine as it always hatched eggs for Mr. Corey?

A. As far as I know that is correct.

Q. Now, you took those readings on your barometers—on your anemometers, last night, and you made six readings, did you not, in the egg columns?

A. Yes, sir.

Q. And when you made your corrections for the calibration of the anemometer, and you took your average, you found that the average speed of the air through the egg column was 142 feet per minute?

A. That is correct.

Q. And that was in a Smith machine that was in actual operating condition?

A. Yes, sir.

Q. And you could have hatched the eggs in it if you had wanted to with that speed?

A. I think you could.

Q. And then you spent $1,000 on eggs to demonstrate that the speed through the air columns in the Smith machine is 142 feet per minute, is that so?

A. That recorded speed in that particular place was 142 feet average.

Q. And you spent $1,000 on eggs to prove that the only difference in the speed of the air in the Smith machine and in the James Way machine was a matter of seven feet per minute, is that not so?

A. The readings which you have in your hand there, which were made by Mr. Taggart and then put in evidence, were made with a large anemometer. I was very much surprised——

[fol. 671] The Court: No; he is asking you now about the difference in the readings between the Smith machine as you made it and the James Way. Confine yourself to that.

The Witness: I am confining myself to it, your Honor.

Mr. Toulmin, Jr.: Your Honor, he is referring to this thing he has in his hand.

Mr. Ely: And they have accepted this and have offered no other figures, and Dr. Greene, in answer to my question yesterday said he accepted this thing as correct.

The Witness: Yes, sir.

Q. Now, I am asking you whether the difference in the average speed in the Smith is only seven feet per minute higher than the average speed in the James Way machine?

A. The average reading on this, your Honor, is 142½. We have taken these numbers, but last night——

By the Court:

Q. I think you ought to answer the question.

A. Well, this is not correct, your Honor.

Q. Just answer the question, yes or no. Let us get down to the answer.

A. Will you ask the question again, please, Mr. Ely?

Q. It can be answered, yes or no.

Mr. Toulmin, Jr.: I presume the Court means, after he answers, yes or no, he may make any explanations he wishes.

[fol. 672] The Court: I suppose you can bring it out on re-direct examination, but I think we are making the records too long, and these questions can be and should be for the information of the Court, answered directly, for clarification. I think the question is simple, whether there is an increase of seven feet as between these readings you made last night in the Smith machine and readings in the James machine, as I understand it; just read the question.

(Question read as follows:

"Q. Now, I am asking you whether the difference in the average speed in the Smith is only seven feet per minute higher than the average speed in the James Way machine?")

The Court: That you made the test in here, you mean?

Mr. Ely: Yes, the tests that were made last night.

Mr. Toulmin, Jr.: Just answer that, yes or no, doctor.

A. I don't get seven feet difference.

Q. Well, perhaps my mathematics is wrong; perhaps it is six and one quarter feet?

A. I don't know that until you give me the figures and I will subtract them.

Q. The average for all the trays as given on Plaintiff's Exhibit No. 24 is 135.75. Your average last night was 142. Now, what is the difference?

A. The difference between 142.2 and 135.75 is 6.45 feet in favor—that shows that the 142.2 read in the Smith ma-
[fol. 673] chine is 6.45 greater than the 135.75 which you have read from the results of Mr. Taggart's——

Q. As I have read; will you look at it?

A. And the chart shows that 135.75.

Q. And you accepted these charts in answer to a question of mine yesterday, as correct, and you have no other charts or no other figures showing speed in the James Way?

A. That was correct yesterday morning; yesterday evening, all things have changed from what Mr. Taggart said at the test, and therefore, I do not accept these figures.

Q. You do not accept these?

A. I do not accept those figures.

Q. That is, since you found the speed was about the same, you want to change your testimony as to what the speed was in the James Way?

A. No, the results, as Mr. Taggart said he did not apply any corrections to the anemometer, the anemometer reading is not correct. Moreover, last night I read Mr. Taggart's testimony very carefully, and the inner readings were taken by setting an anemometer—putting it in position, starting the machine, running it for two minutes, and then taking it out, and as you noticed, the anemometer, after the wind stops, is continued. I believe the readings of the anemometer were not correct.

Q. It is rather late in the proceedings, I would say, for you to come in and dispute this chart which you said you were perfectly willing to adopt?

A. I think it is, sir, but Mr. Taggart never told us how
[fol. 674] he did it, and I thought as an engineer, he would not use an anemometer without correction.

Q. However, you adopted this chart as correct?

A. That is right, sir.

Q. And now you find that these conditions in the Smith machine are exactly as represented in this chart, now you want to change your testimony and say the conditions are, different in the James Way machine, is that the point?

A. That is not the point.

Q. Now, you knew very well when you were making criticisms of Mr. Taggart's readings on the Smith machine, that he had testified that he had not made corrections for calibration, is that not so?

A. That is what he stated in my presence; I do not know that that is true, but that is what he said.

Q. He did say so, however?

A. That is my understanding of what he said.

Q. And had you made similar corrections for calibration, which I understand do not vary greatly with different anemometers——

A. They vary very greatly.

Q. But had you added corrections for calibration to Mr. Taggart's readings, you would have come just about to the point that you came last night, would you not?

A. It all depends on what the calibration is. You see, there is a zero point in the curve.

Q. Yes, I understand.

A. And I don't know where the curve is.

Q. At those low speeds, however, all anemometers that you know about add for the purpose of calibration at those low speeds?

A. Usually they do, sir.

[fol. 675] Mr. Toulmin: I am going to start with the affidavits that were on the preliminary injunction motion, which have been marked in that motion, Defendants' Exhibits 1 to 7.

Mr. Ely: I object to the receipt in evidence of those affidavits, your Honor. They are ex parte affidavits. There was no cross-examination on those affidavits, and I object to them.

The Court: I think the Court has a right to consider them, do not you?

Mr. Ely: I do not think they should go in as exhibits in the case. No doubt you will consider what went on in the preliminary injunction proceedings, but they certainly are not evidenced in this case, because they are ex parte affidavits and there was no cross-examination.

The Court: I beg your pardon. I understood you were talking about the other—I thought you meant the affidavits before the Examiner.

Mr. Ely: Oh, no.

The Court: These are the affidavits on the preliminary injunction?

Mr. Toulmin, Jr.: Preliminary injunction motion. We are going to ask that Mr. Taggart's affidavits, their affidavits on the other side, be likewise put in so we will have this record complete.

Mr. Ely: You have a perfect right to put my affidavits in.

Mr. Toulmin, Jr.: We have a perfect right to put ours in, too.

Mr. Ely: I beg your pardon; not over my objection. I [fol. 676] am not putting in your affidavits.

The Court: Of course, you have the right to contradict witnesses by affidavits in contradiction, but how have you the right to put in here your own affidavits, proofs submitted on the preliminary hearing? It could not be done even if there were no preliminary hearing. How does a preliminary hearing give any additional right to do it? As a matter of law, it seems to me it would not be competent.

Mr. Toulmin, Jr.: If your Honor so rules——

The Court: I want to know, do you think the affidavits made on that motion would be——

Mr. Toulmin, Jr.: Yes, I think so because the witness—in particular, Dr. Greene, has referred to Mr. Shodron's affidavit as to the order of eggs, how they were set in the James machines. There has been cross-references from this testimony to these affidavits.

The Court: Mr. Shodron has been right here, a witness on the stand.

Mr. Toulmin, Jr.: Very well, your Honor.

The Court: I just want to be right on the question; I do not want to exclude any evidence that is properly receivable, but my ordinary limited knowledge of the law would lead me to think that these affidavits would be hearsay.

Mr. Toulmin, Jr.: All right, sir. Then we tender these affidavits which we have marked for identification, as De- [fol. 677] fendants' Exhibits 1 to 7, inclusive, under Equity Rule 46, and ask that they be so marked.

The Court: Have you any authority on that proposition?

Mr. Toulmin, Jr.: I will submit them to your Honor.

The Court: I do not want to exclude it if I am wrong on the matter but I am just applying the ordinary rules of evidence, which possibly might not be applicable to a case of this character.

(Seven affidavits marked Defendants' Exhibits 1 to 7, under Equity Rule 46, as follows: Dr. Greene, No. 1; Mr.

Shodron, No. 2; Mr. Willett, No. 3; Mr. James, No. 4; Mr. Markey, No. 5; Second affidavit of Mr. Shodron, No. 6; Mr. Walmsley, No. 7.)

Mr. Toulmin, Jr.: Then Defendants' Exhibit No. 8 is a certified copy of the file wrapper, in the Patent Office of the Smith Patent in suit, which we offer in evidence.

Mr. Ely: You go right ahead until you come to the next thing I object to.

Mr. Toulmin, Jr.: We have checked these over. In connection with No. 8, we have here a photo-lithograph copy, which we will check for accuracy and if that is found to be accurate, Mr. Ely and I have agreed to substitute it because it is easier to read than one of these photostats.

(Lithograph copy of file wrapper of Smith patent in suit marked Defendants' Exhibit No. 8.)

[fol. 678] Mr. Toulmin, Jr.: Exhibit No. 9 is a certified copy of the translation, of the Patent Office of the patent to Stulik.

(Certified copy of Patent Office translation of patent to Stulik marked Defendants' Exhibit No. 9.)

Mr. Toulmin, Jr.: We offer Exhibit No. 10, which is the volume of prior art which we have been referring to.

(Volume of prior art marked Defendants' Exhibit No. 10.)

Mr. Toulmin, Jr.: We offer Exhibit No. 12, a magazine containing an article entitled "Mammoth Incubator with fans for circulation of air, etc.", by George F. Paul, at pages 248-249.

(Magazine containing, at pages 248-249, article on "Mammoth Incubator with fans for circulation of air, etc.", by George F. Paul, marked Defendants' Exhibit No. 12.)

Mr. Toulmin, Jr.: We offer Exhibit No. 13, which is a copy of the publication "The Dollar Hen", with special reference to pages 77 to 107.

(Copy of Publication, "The Dollar Hen", particularly with reference to pages 77 to 107, marked Defendants' Exhibit No. 13.)

Mr. Toulmin, Jr.: We offer as Exhibit No. 14 the book "The New Egg Farm".

(Copy of book, "The New Egg Farm", marked Defendants' Exhibit No. 14.)

Mr. Toulmin, Jr.: We offer as Exhibit No. 15 the catalog of the Smith Standard Company, with particular reference to pages 10 and 11.

[fol. 679] (Catalog of Smith Standard Company, with particular reference to pages 10 and 11, marked Defendants' Exhibit No. 15.)

Mr. Toulmin, Jr.: We offer as Exhibit No. 16 this circular of the Smith Standard Company in connection with separate hatcher matters.

(Circular of Smith Standard Company in connection with separate hatcher matters marked Defendants' Exhibit No. 16.)

Mr. Toulmin, Jr.: We offer as Exhibit No. 17 this copy of the large Smith Incubator Catalog No. 47.

(Copy of Large Smith Incubator Catalog No. 47 marked Defendants' Exhibit No. 17.)

Mr. Toulmin, Jr.: We offer the several drawings, 18-a, 18-b and 18-c, of the internal construction of our incubator; I want to call to the attention of the Court that there was an error in leaving out that top line. We discovered it when we got here and we have produced corrected drawings which are already in evidence. The draftsman left out one of those lines indicating that tin on top. We discovered that when we got ready for final hearing. That was on the preliminary injunction.

(Three drawings showing internal construction of various sections of Defendants' incubator marked Defendants' Exhibits No. 18-a, 18-b and 18-c.)

Mr. Toulmin, Jr.: We offer as Exhibit No. 19, a chart showing various types of construction that have been held by District Courts and various Courts of Appeals as non-[fol. 680] infringing. We have had quite an argument on that before. Part of it was admitted by Mr. Ely as correct; the other part was not.

Mr. Ely: I object to that as not being proven in any stage of these proceedings. I think you have already sustained my objection.

The Court: As far as these charts are concerned, of course, if you will call my attention to the cases, I will see what the cases are. I suppose it might be of aid to the Court in construing——

Mr. Toulmin, Jr.: That is the only purpose of putting this in; not to conclude you or the other side on the construction, but to have before you our understanding and representation of these structures, some of which are admitted by the side as correct. Your Honor will compare that with the opinions that are in evidence. You are not bound by Exhibit No. 19. It is for convenience and aid to the Court. Now, I am going to offer this Exhibit; if your Honor rejects it, I will mark it for identification.

The Court: Counsel, as I recall it, objected to some of the references made underneath the diagrams, which were your conclusions as to the effect of the opinion.

Mr. Toulmin, Jr.: No, your Honor, they are quotations from the opinion.

The Court: I think there is one——

Mr. Toulmin, Jr.: I am perfectly willing to have the Court disregard that.

Mr. Ely: I object to these things going in, your Honor, as [fol. 681] they are not proven.

Mr. Toulmin, Jr.: We think they are proven.

Mr. Ely: What right have they to put in something that they think is something that was in the case, and ask you to look at it——

Mr. Toulmin, Jr.: Just as much right as you had to put in your Exhibit 27, which is an illustration on the same basis.

Mr. Ely: Mr. Taggart was present at every one of those trials concerning which I put in drawings.

Mr. Toulmin, Jr.: Yes, and Mr. Taggart answered my questions about three of the illustrations in Exhibit 19, and admitted that those illustrations were correct representations.

Mr. Ely: I think you have no business putting in something where the construction has not been proven; it is not true.

The Court: That does not apply, as I understand, to the Petersime case.

Mr. Ely: No; may I come up there a minute?

The Court: Yes, let us see what the differences are.

Mr. Ely: I have no objection to this, this or this.

Mr. Toulmin, Jr.: Make the record clear. "This" does not mean anything.

Mr. Ely: I have no objection to the showing under the heading "Smith vs. Petersime". I have no objection to the top two views under the heading "Smith vs. Blum". I ob-
[fol. 682] ject to the third showing under the column headed "Smith vs. Blum". I object to all of the drawings under the column headed "Smith vs. Bolling". I object to all of the drawings under the column headed "Smith vs. Hillpot". Those have not been proven, and they are not correct representations of the things that appeared in that litigation.

Mr. Toulmin, Jr.: With reference to the third illustration, under the Blum column, the Court will find that a duplicate from the record of Blum, which was put in. Your Honor can determine the defendants' construction, and your Honor can compare that and determine whether it is right or not. As to the Boling construction in the third column, your Honor will have the testimony in the Bolling case, a certified copy of which was put in here, to determine whether that is correct. Mr. Taggart, as to the Hillpot construction, said that that construction was an experimental one, although involved in the case, but experimental. He also made a drawing for me on cross-examination, showing what he said was the machine in issue in that case.

Mr. Ely: You can put that in. No objection to your putting that in.

The Court: I thought you said Hillpot is objected to.

Mr. Ely: It is another drawing of another machine.

The Court: Mr. Toulmin, I think that the safer way is to exclude this, and I do not think it is at all harmful to you, because I think the same things appear—what the deci-
[fol. 683] sion is will appear in the decision itself. Now, unless you can point out in the decision that the particular descriptions that are shown on this diagram were descriptions of the instrument or the things the Court passed upon, that is another thing; but to introduce here certain diagrams which I cannot determine whether they were considered or not——

Mr. Toulmin, Jr.: I asked Dr. Greene in connection with that matter, as to whether he had read those records and whether those drawings were correct, in his connection as an engineer, and he attempted to testify, and that testi-

mony was excluded, on a number of these illustrations; upon objection, that was excluded. Now, I have done all I could to get before the Court the illustrations. I have all the records in as they have been available. I have attempted to have the witness, an engineer, who has read those records and had looked at those drawings, say they are correct descriptions in his understanding.

Now, I present this to the Court, and I ask that this Exhibit 19 be marked for identification under that number, and I tender it under Equity Rule No. 46, for such advantage as it may be to the Court. When your Honor reads the proof and the decisions, I think your Honor will find I am correct, that this will be very helpful to you in passing on the matter.

The Court: I am going to exclude the entire exhibit.

[fol. 684] Mr. Toulmin, Jr.: Then we tender it under Rule No. 46.

(Chart showing various types of construction that have been held by District Courts and Courts of Appeals as non-infringing, with quotations printed at the bottom, from the Courts' opinions, marked as Defendants' Exhibit No. 19 under Equity Rule No. 46.)

Mr. Toulmin, Jr.: Now, we come down to the deposition exhibits. Have you any objection to offering these?

Mr. Ely: No.

Mr. Toulmin, Jr.: They are listed here in the depositions as filed. They are "Exhibits 20 to 27, inclusive, Exhibit 26 being a, b, c, d, e, f, g. Unless Mr. Ely wants me to read them out, I will not read them out to save time.

Mr. Ely: No.

Mr. Toulmin, Jr.: We offer them in evidence, and we offer the three depositions of Hastings, Hickox and Peabody, which were taken. I do not think, under your practice, your Honor, it is necessary to give the depositions any exhibit number, but just offer them in evidence, is sufficient. That takes care of that.

(Defendants' Exhibits Nos. 20, 21, 22, 23, 24, 25, 26-a to 26-g, inclusive, and 27, appearing in depositions of Hastings, Hickox and Peabody, received in evidence.)

Mr. Toulmin, Jr.: I offer the Smith testimony in the case of Buckeye and Smith vs. Cooley, in the Third Circuit with

[fol. 685] the understanding that Mr. Ely, if he has a copy of the original record, may substitute it for this testimony if he wishes; otherwise he can correct.

Mr. Ely: Yes, I think that is all right; and I think also it should be noted at this point in the record that we will insert excerpts from the Hillpot, Snow, Wolf and Waxham, cases, where Dr. Smith also testified.

Mr. Toulmin, Jr.: We have no objection. We offer this as Exhibit No. 76, so it can be marked.

(Testimony of Dr. Smith in case of Buckeye and Smith vs. Cooley in the Third Circuit marked Defendants' Exhibit No. 76.)

Mr. Toulmin, Jr.: We want to re-offer Exhibit No. 28, which was the Petersime Catalog, here marked for identification.

Mr. Ely: I will withdraw my objection.

Mr. Toulmin, Jr.: 28 is in, then.

(Petersime Catalog, previously marked Defendants' Exhibit No. 28 for identification, marked Defendants' Exhibit No. 28 in Evidence.)

Mr. Toulmin, Jr.: We offer as Exhibit No. 29 the Taggart sketch he made on cross examination, showing the Hillpot construction that was in issue down in Philadelphia, in this Hillpot case.

Mr. Ely: No objection.

(Sketch of Hillpot construction, made by Mr. Taggart, previously marked Defendants' Exhibit No. 29 for identification, marked Defendants' Exhibit No. 29 in evidence.)

[fol. 686] Mr. Toulmin, Jr.: We want to re-offer Exhibit No. 48, which is the Volume of prior art cited in the Jones-Cyphers case, an important decision which we are going to rely upon in this Court.

Mr. Ely: No objection, with the understanding that those patents were not set up in the answer.

Mr. Toulmin, Jr.: That is right.

Mr. Ely: They are only offered for the purpose of showing the state of the art and not anticipation.

Mr. Toulmin, Jr.: That is right, and to show what was before the Court at that time.

(Volume of prior art cited in Jones-Cyphers case, previously marked Defendants' Exhibit No. 48 for identification, marked Defendants' Exhibit No. 48 in evidence.)

Mr. Toulmin, Jr.: We want to re-offer Exhibit No. 49, which was a group of our own patents; your Honor will recall the Markey patents and the Nix patents.

Mr. Ely: I object to that as entirely without any bearing on this situation. We are not trying the question of whether there might possibly have been a patent granted to James Way on this structure that is in suit. What we are trying here is the question of infringement of the Smith, earlier underlying Smith patent, by James Way construction and I cannot see where patents which were issued some 15 or 17 years later, to James Way, with narrow claims of structure, have got any bearing whatsoever upon the matter of infringement. It has been so held in many cases.

[fol. 687] Mr. Toulmin, Jr.: Our position is that the Supreme Court, and the Courts of Appeals, and this District Court, have held to the contrary.

The Court: You can submit authorities.

Mr. Toulmin, Jr.: Do you want me to submit authorities now?

The Court: No, I will take it under advisement. Are these any reissued patents?

Mr. Ely: No.

The Court: Your claim, Mr. Toulmin, or your position is that the proof of patents subsequent to the issuance of the Smith patents is competent?

Mr. Toulmin, Jr.: Yes, your Honor, is vital to this defense as showing a strong presumption of non-infringement, so held by the Supreme Court of United States and your Court of Appeals.

The Court: You mean because of the action——

Mr. Toulmin, Jr.: Of the Patent Office.

The Court: In passing——

Mr. Toulmin, Jr.: Yes.

Mr. Ely: Mr. Toulmin very well knows that the Patent Office does not pass on the question of infringement when it grants patents on improvements.

Mr. Toulmin, Jr.: It does on the question of infringement.

Mr. Ely: It does not pass on the question of infringement, and he knows that very well.

[fol. 688] The Court: Well, I would just like to have a case on each side to see what there is to it. I can see the basis of his argument.

Mr. Ely: I would suggest, your Honor, that those go in and you defer your judgment on that until you look at the decisions.

Mr. Toulmin, Jr.: That is satisfactory to us. That is the way we had it before, but I had to reoffer those; in the event the Court denies our right to put in Exhibit No. 49, marked for identification, let the record show that I tendered that evidence under Equity Rule 46.

The Court: Very well.

(Folder of patents owned by defendants, formerly marked Defendants' Exhibit No. 49 for identification tendered in evidence under Equity Rule No. 46.)

Mr. Toulmin, Jr.: Now your Honor, I would like to offer in evidence this little model of the James Way—it will be convenient to refer to—as our Exhibit No. 77.

(Small model of James Way incubator marked Defendants' Exhibit No. 77.)

Mr. Toulmin, Jr.: And we have another block model here of James showing separate hatcher, which we offer in evidence as Exhibit No. 78, for illustration.

The Court: That is what you call the hatcher?

Mr. Toulmin, Jr.: Yes, separate hatcher mounted on top of the block incubator so you can see the arrangement.

(Block model of James incubator showing separate [fol. 689] hatcher marked Defendants' Exhibit No. 78.)

Mr. Toulmin, Jr.: We have a model here of the Smith patent that we would like to offer in evidence as No. 79.

The Court: That is the shell, you mean?

Mr. Toulmin, Jr.: Yes, and some of the interior works with the detachable end doors and the curtains.

(Model of shell and some of the interior works of Smith machine marked Defendants' Exhibit No. 79.)

Mr. Toulmin, Jr.: And we would like, in order to be consistent here, to offer in evidence the Taggart affidavits on the injunction motion as our Exhibit No. 80.

Mr. Ely: No objection.

(Taggart affidavits on preliminary injunction marked Defendants' Exhibit No. 80.)

Mr. Toulmin, Jr.: The Defendant rests, your Honor.

JOSEPH INSKIP TAGGART, recalled as a witness on behalf of Plaintiff in rebuttal, testified as follows:

Direct examination.

By Mr. Ely:

With reference to considerable discussion about this matter of separate hatchers, and the matter of the spread of B. W. D. in incubators there has been some intimation, possibly, that we stick to our old scheme in spite of how every-
[fol. 690] body else has gone. To give a brief history of the situation: In 1926, Hinshaw, Upton & Moore, in making certain investigations at Manhattan, Kansas, were working with a Buckeye forced draft machine; and found that the germs of salmonella pullorum were spread in that incubator. They made their report on that incubator only. They had not checked any of the others.

The Court: Is that the report to which Dr. Greene referred, and the other referred?

The Witness: Yes, sir. Dr. Hinshaw, whom I know personally, did not make tests in any other type of machine. Following that, the Bureau of Animal Industry as a part of the Department of Agriculture at Washington, took up the investigation on their disease farm just out of Washington. There they investigated, with different types of incubators, and also with hens, setting hens. Those investigations took place at Beltsville or Bethesda, wherever the disease farm is located. They worked with different types of incubators, both forced draft and also still air, and also with hens. They found that wherever diseased chicks were hatching in proximity with free chicks, or what we will term as free chicks, the disease might spread, whether it was under hens, in still air machines, or in forced draft machines. In other words, the disease spread in all types of machines.

[fol. 691] I attended those investigations at different times, helped plan the experiments, and knew what was go-

ing on from the very beginning until the completion of the program. Following that there were certain investigations made at Kansas Agricultural College, and also at Ohio State University, to show how you could prevent that spread.

By the Court:

Q. Was any report made of that investigation to which you have referred?
A. Yes, sir.
Q. Published report?
A. Yes, sir.

By Mr. Ely:

Q. You have it, have you not?
A. Yes, sir.
Q. Where is it? Have you got it here?
A. I will get it (producing).
Q. This is the one you are speaking of.
A. Yes, sir.

The Court: That is the one you first spoke of?
The Witness: This is the one we spoke of, that was put out by Dr. Bunyea and Dr. Hall, who are investigators at Washington.

I also have the report of the Ohio Poultry Investigation conducted by Ohio State. These investigations are summed up, really in the Ohio Bulletin which came out later, and if you refer to page 7 of the Ohio Bulletin, down near the [fol. 692] bottom of the page, under the heading "chick down spreads bacteria," it states:

"During the season of 1928 studies made at Ohio State University showed that disease germs are spread on the down of infected chicks. This means that all chicks hatching in an incubator are exposed to all the diseases which any of the chicks may be infected."

And it goes on to refer to the investigation there at the Bureau of Animal Industry. It shows that disease may be spread from one end of an incubator, even though the egg chambers are separated:

"The dust and chick down floating in the air of the incubator room are taken into the machine with fresh air for ventilation, and no doubt cause the spread of the disease."

Now, on page 8, near the bottom of the page, in the second line—or we will read the first part of the paragraph under "The study of disinfection during incubation." It says:

"Great danger lurks in the floating dust and chick down in the incubator room and incubator. There can no longer be a question about the spread of disease in all types of incubators from infected to healthy chicks by this means."

It has been found that the most effective way of combatting the spread of B. W. D. is not to hatch eggs from in- [fol. 693] fected hens, but in the corn belt and in most of the United States, it is not possible, for the most part. The disease is so widely spread; and the best method is to keep the humidity at such a point that the particles of dust and down do not float about the incubators; and then, furthermore, in the forced draft machines, where you are hatching in forced draft machines, you can fumigate with formaldehyde gas at stated intervals and kill the germs before they start to float about the machine.

You do this after the chick is hatched from the shell. No spread can take place until the chick gets out of the shell, and until that chick has dried sufficiently for the down to float about. The germs are on the outside of the chick, while the down is still moist, and they will be liberated when the chick dries, and if the air is dry enough for it to float about in the air; but we have found on experiments that if we keep a wet bulb reading of 88 to 90, that is, a wet bulb reading during that period, there are practically no germs floating about in the machines, and that is our reason for specifying a humidity of 88 to 90 during the period in which the chicks are actually coming from the shell.

Asked whether the forced draft machine was better or worse as an effective means for controlling the humidity, the witness said:

In the still air machines there is no way to control the humidity. You depend entirely upon evaporation, and if you are not forcing the air about in a still air machine, you do not know how much humidity you have. It is purely a matter of guess. There is no way of measuring it, that is practical [fol. 694] for a hatchery man. Even the James catalog specifically condemns any instructions for measuring the humidity of air in a still air machine, and it is only in forced

draft machines that you can get the humidity that you want, and can hold it at a specific point. In forced draft machines, where you have air moving, there are instruments that will measure and tell you just what humidity you have.

The presence of excess or of more humidity, when the chicks are out of the shells, prevents the down upon which the germs are lodged from drying so rapidly. Instead of the chicks drying off in four or five hours, it would take 12 or 13 hours or longer, to dry; and then, if you hold the humidity at 88 to 90, wet bulb reading, the down does not float about in the machine to any marked extent at all.

In actual comparisons, we have found that when we changed the wet bulb reading from 76, which was the custom prior to 1928, to 88 to 90, that we cut the amount of foreign particles floating about in the air to about seven percent. of what it was before that.

These particles of down are light enough to float in the air of what is known as the still air incubator, such as the James Way type, that is the hatcher. They do float about. This was so demonstrated at the Washington experiment, and they not only float about in the incubator, but they pass out into the hatching room and are carried around by the air currents and back into the other incubators again; and they were found spread from one end of the sectional machine to the other end, where they thought they were trying to keep them separated.

[fol. 695] As a means for combatting this spread, the forced draft machine is much better, as far as the matter of moisture is concerned. Asked whether a forced draft machine or a still air machine was better for fumigation, the witness said: You cannot fumigate in a still air machine, because it is one of the peculiarities of the set-up, you have to have forced draft and high humidity, which is possible in a forced draft, to make it practicable. Any attempts that have been made to fumigate still air machines with formaldehyde have resulted in failure. It affects the chicks in the first place. It is, in theory, forced through the machine so as to kill the germ, and furthermore it affects the chicks very decidedly and causes a heavy mortality in them.

As to when our company recommended increasing the moisture in the incubator at the time of hatching, the first definite instructions we gave out on that was in July, 1928.

Asked how long prior to that time the Smith and Buckeye machines had been in successful operation, the witness said: The Smith machine started to manufacture in 1922, as it now is, and the Buckeye in 1917. They sold thousands and thousands of those machines without any recommendation about increasing humidity at hatching time. Some of them had very definite instructions on not increasing moisture at hatching time and so far as the records I have been able to get hold of are concerned, the Smith people were the first people to come out definitely with any instructions about increasing humidity at hatching time. If you have the same relative humidity, the same average [fol. 696] relative humidity right straight through, you will get substantially the same results, as to the hatching of eggs. The hen does not increase humidity at the time the chicks are coming out. I have gone through dozens of experiments that have been conducted in scientific investigation into incubation and not one have I found where it said to increase humidity at hatching time.

In 1928 we discovered high humidity would hold down the spread of this disease. The increase of humidity was simply an improvement in the way of using the Smith machine. It did not change in any way the basic process of the Smith machine.

The Court: Were there any instructions saying anything about the use of formaldehyde in certain periods of incubation?

The Witness: Yes, instructions have been put out since 1928, recommending that use.

We recommend one fumigation when about one-third of the chicks are out of the shell; another fumigation approximately 12 to 15 hours afterwards, and in some cases a third fumigation 12 to 15 hours later. These fumigations are at short intervals and the strength of the gas is only in there about ten minutes. Fumigation is not recommended before the chicks start coming out of the shell to prevent the spread of B. W. D. We have some other micro-organisms in there that sometimes develop, such as certain weeds get in fields some times, and by using a stronger fumigation, stronger than the chicks would stand, we are able to fumi- [fol. 697] gate the eggs and get rid of that. That is not

a matter of combatting B. W. D. It has nothing to do with B. W. D.

I recall that Dr. Hutt said, at Page 470 of his testimony, "At the 17½ or 18th days, the process of hatching is begun" and again on page 472, "I would not say that the process of hatching began on the 17½, but on the 18th day, then the inclusion of the yolk begins." I recall that Dr. Hutt said in there that the process of hatching, as distinguished from incubation, began on the 17½ and 18th day. I recall you asked Dr. Hutt for authorities. He gave you the names of two books. I made a careful search, not only through those books but other books, and I have not found any authority for any such division, whatever.

Wherever in general terms "hatching" is used it covers the whole period, but wherever in a scientific treatise they have used the word "hatching" to designate a specific part of the process, it covers only that which would correspond to birth or to the actual coming out of the shell, which is a matter of a few hours. I could find no authority in these books cited by Dr. Hutt, which divided the period into a period of incubation and a period of hatching, the line of which was marked at the 17½ or 18th day, but I found other statements otherwise. I have those books.

This book I have is entitled "Poultry Production" by Lippincott, this is the 1927 edition which Dr. Hutt referred to. On Page 264 it speaks of the development of the egg, "The growth and transformation of the tiny living portion [fol. 698] of the organ or a just vitalized egg through the successive, though well defined stages of blasdoderm, embryo, and finally a chick, capable of breaking its way out of the shell do take up an independent existence. The incubation period thus is analogous to the gestation period in mammals. It begins with the fertilization of the ovum and continues until the hatching or birth." Then, again, on the fourth line, at the top of page 265 it reads "Of the 21 days of the incubation period", definitely specifying the incubation period covers that 21 days. At numerous other places it makes similar statements, and to show that where he makes a distinction, such as for special purposes, I ask you to refer to the bottom of page 289 where he has referred to certain tests that have been run. "In the first test hatching occurred on the 19th and 20th days; in the second on the 20th and 21st day." In those cases, he has

been speaking about tests he has run with incubators at different temperatures, to see whether the incubation period was shortened or lengthened.

Then there is Dr. Jull's book, "Poultry Husbandry", by Morley A. Jull, and it is a 1930 edition. On page 169, the first line, under the paragraph entitled "The development of the chick", he says "The normal incubation period of the egg of the chicken is 21 days." The bottom line of that same paragraph says "The incubation period of all chicken eggs may be said to be 21 days." Then on page 182 there is an interesting description in which he describes the development of the large muscle at the back of the chicken head, which the chick uses for the purpose of picking its [fol. 699] way out of the shell. It states that this muscle starts to develop about the 19th day, reaches its greatest size about the 21st day, and then the day after hatching, it starts to dry up and by the 8th day is practically disappeared, the eighth day after "hatching." At the bottom of this page, page 182, it refers to this complex muscle, that the peak of growth cycle of the complex muscle does not occur until the 21st day. At the end of that paragraph, on the top of page 183, it states "We may take the growth cycle of this muscle as a typical example of the temporary and emergency growth acceleration, then a second part, and as a type of the important and rapid changes which take place in the chick immediately prior to hatching". I simply mention those two points to show that where they do make a distinction between hatching and incubation, hatching covers only the birth period or actual cutting out of the shell.

After you have carried a hen's egg up to this birth point, there is a great deal more tolerance possible in your control arrangement and your temperature, and so forth, around an egg during the last period, that actual cutting out period, than there is in the earlier stages of incubation. You can abuse it much more during those last few hours. We do not recommend that you abuse it, but it will stand lots of grief in that particular period. You could carry out the process of hatching eggs, in the Smith machine, up to the time the chicken peeps and then you could take those trays out and set them any place where you could keep the temperature reasonably right and have a fairly good humidity, and the chicks would come out. It is not necessary [fol. 700] to carry it up to the high point we mention here

for the purpose of hatching. The eggs which are in the incubator are receiving the benefit of the Smith process the whole time, even though they may not be hatching in the technical sense of the word.

"Incubation" and "hatching" are considered the same in common parlance.

The Fullington Patent 1,205,445, is for an incubator attachment. He shows an ordinary incubator with one layer of eggs and, while he shows no eggs at all, it is an ordinary incubator, and into the side of the incubator he has put a pipe which will carry air from a fan on the outside into the incubator and a corresponding pipe to carry air out of the incubator. The pipe 18 carries the air in and the pipe 17 takes the corresponding amount out. The pipe 17 discharges into what is known as a fan compartment, but the fan does not draw its air from the fan compartment but rather through an opening 20 which is to the outside. This fan is supposed to be normally quiescent, that is, normally it is not supposed to operate and is set in motion when the lamp, which is furnishing the heat, raises the temperature to a point that is too hot. That is, the action of the lamp, as described here, controls the electric contacts which start this fan in motion and when the fan is in motion, it is supposed to blow cool air into the incubator and force the hot air out. That is not a recirculation or recycling of the same body of air in the interior of the incubator. It is blowing the air right through the incubator. That would naturally carry out any moisture content within the incubator. He would naturally carry out his moisture content [fol. 701] if he blew his heat out. That does not operate continuously. It states it is normally quiescent. As to when and under what conditions the fan will start to work, it states here if the heating element or lamp is producing too much heat, there is a damper above the lamp that will raise and make the electrical contact and start the fan going. It states here "if the heater gets too hot", it does not say what happens inside the machine. That is shown as an attachment on an incubator of the single deck, old style machine, which held approximately 200 eggs or less. He does not say anything there about any staged incubation. The only one of these Fullington devices that I have ever seen was the one that Fullington submitted in the Waxham hearing at St. Louis. As to whether that ever got on the market, it was never manufactured. There was

a crude affair which Fullington introduced there as a sample he made at that time. He stated he used it during one or two hatches in 1914 and never used it since.

In that Fullington machine, his idea was to control the heat by blowing cold air into the machine and forcing the hot air out. He never had staged incubation, as I recall. As when defendants purchased this patent, all I know is what Mr. Fullington testified to in the Waxham Case. I have never seen a James Way machine carrying the Fullington Patent number. That Fullington patent and the alleged Fullington prior use was before the Master in the Waxham case.

I have a patent here to G. E. Goldstein, No. 1,137,752, which patent is for an apparatus for the curing and arti- [fol. 702] ficial aging of cigars. I am familiar with what patents were set up in the various suits. This Goldstein patent has been referred to in practically all of the cases. The Proctor patents have been in practically all these suits.

Comparing the principle in the Goldstein Patent with this machine which was supposed to be constructed in accordance with the Goldstein patent, the great big difference is in the way the air is circulated and the amount of air that is circulated. The Goldstein Patent is for the curing and artificial aging of cigars. In such a device they are not particular about the exact temperature. They are particular about humidity; they want a high humidity. They have a small fan, a very small fan, shown in the patent, in close proximity to a humidifying device, and the purpose of this is to keep fairly constant humidity in a room. In various humidors, that I have been in, they might have a room two or three times the size of an ordinary bed room, and an eight inch fan would be as large a fan as they would use, and that would be running maybe eight or nine hundred R. P. M. Comparing that fan with the fan in the so-called reproduction of the Goldstein patent, in the reproduction the fan was many times larger, by comparison. In the reproduction of the Goldstein machine, the fan was mounted in a panel that would compel air to circulate in definite paths and in the patent there is no such panel shown. They have not followed the disclosure in the Goldstein reproduction. As a matter of fact, I have never found a one of these constructions shown in these various patents for hatching eggs, to my knowledge on the market or ever put to use.

[fol. 703] Mr. Ely: The two bulletins are sufficient. The first one I will put in, "Transmission of pullorum disease" by the Agricultural Department.

(Bulletin entitled "Transmission of pullorum disease" by Agricultural Department received in evidence and marked Plaintiff's Exhibit No. 30.)

Mr. Ely: And a second booklet entitled "Sanitation in Hatcheries".

(Booklet entitled "Sanitation in hatcheries" received in evidence and marked as Plaintiff's No. 31.)

As to commenting on Defendants' Exhibit 75, which is the tabulation Dr. Greene produced this morning, in the first place, the machine shown down there had the standard type of fan we used for seven, eight or nine years in actual operation, and he has mis-quoted here. It is stated that I had twelve hundred feet per minute leaving the fan. At one spot where the air was shown coming off there is a velocity quoted there of 1140, I believe. At one point taking the tests the same way, last night, we had a velocity of 1000, practically nine hundred and some feet. At that point I mean, and the comparison here is clearly exaggerated. If the conditions as produced by the machine down there last night, the fan delivery and so forth, were very comparable with the conditions under which I experimented, and had I made the correction on the anemometer, which I did not state that I made; I stated that I recorded the readings of the anemometers placed in those positions. I knew the [fol. 704] speed was not accurate, and it was so stated; it was given to show direction and air movement, and had I made those corrections there would not have been very much difference between what was found last night and what I was working with, and, you can find that much variation in different machines.

In response to questions by the Court, the witness testified:

As to whether the fan in the Smith machine here was the same fan or a different fan in the machine in which the test was made yesterday, the fan used in the machine in which the witness made the test, concerning which he testified as to the speed, the two fans were of the 2900 series, and the

2900 series indicates a certain style fan, and certain style motors and blades, but these down here were called 2989, which means it was a 110 volt, 60 cycle fan. They are the same general type of fan.

Regarding the statement of Dr. Greene that the air moved at the rate of 749 feet per minute, Dr. Greene's method of taking the reading is entirely different from the method which I used and *entirely different from the method which I used and* entirely different from the method that I have ever used. I put the anemometer at the point of greatest velocity, that is, the velocity over the entire surface of the fan is not the same. At the outer two or three inches you get practically all of your delivery of air, there is very little air delivered in the center. Now, when I took my reading with the fan, the anemometer up to the fan, I put it at the point of the highest velocity and took a reading at that point [fol. 705] and I recorded there 1140. If you take your minus correction off that, which you would have to do if you follow his method——

Q. I do not understand what you mean by his method as distinguished from your method. He made a reading below the fan with the same instrument you did, but perhaps not quite as close proximity of the fan.

A. When he made the reading, he kept the instrument going back and forth over the entire surface of the fan, under portions of which air was barely moving and other portions air was moving fast, with the idea of getting an average velocity of the entire space.

Q. How could he see the average velocity? He would have to bring the instrument down?

A. He was holding it underneath the fan in the corridor of the machine and was moving it back and forth underneath the machine and he got an average velocity of seven hundred some feet. The highest velocity shown was approximately one thousand. That is, at some different points in relation to the tips of the fan.

Mr. Ely: I was there when it was done and the anemometer on the stick was held at one point and the anemometer was passed in an arc across the entire fan.

When I measured that 1140. I was talking about, that was the speed at the highest point on the fan, situated at the tip. A current of air distributed by a fan of that kind will,

increase as you go out toward the edge of the fan, as much as from two to one thousand feet per minute.

There would be practically a dead spot in the middle of [fol. 706] the fan, theoretically. Dr. Greene's measurements were made, including not only the high velocity point, but the low velocity point and possily the dead point. My 1140, that I was talking about, was at the high velocity point.

By the Court.

Q. How could he get the average of the instrument during each second of contact?

A. He would read it for a minute. One revolution of the hand indicates 100 feet per minute, or 100 feet has passed and he would put it up and hold it for a minute and move it back and forth across the surface of the fan for a minute, as it was being moved it would cross and recross about five or six times, during the course of a minute, to show the highest and lowest across there. You would get the average of it. My understanding is that his reading is the average of the discharge. He got that average by taking what the instrument recorded during the minute and said that that would be the average because he had kept moving it back and forth and during the entire minute it recorded 700 and some feet, in the course of the minute, and he kept it moving all the time.

We did not attempt to take it at the lowest point. It would give the average, as he took it. It did not give the highest and lowest, it just gave the average.

As to the velocity of the air through the eggs, and what is to be understood as the differences, if any, between my conclusions and Dr. Greene's, in the conditions we had there last night, the velocity up through the eggs averaged 142 [fol. 707] feet per minute, making all corrections. There are six different stations, as Dr. Greene testified, with the anemometer, and the average of those was 142 and a fraction.

My readings as indicated on this Exhibit 11-A, show an average of about 75, or 75 to 80, but there was no correction made in those, similar to the reading of the anemometer which they made in their test last night.

The correction at those speeds is between thirty and forty feet per minute, which would run it up over 100, and

you can easily get that much difference between different machines and the way they are loaded, the difference between that and 135 or 140, that is, if you made the corrections which would run well over 100. I did not make the corrections. I just put down what the anemometer read and I so stated.

Examination by Mr. Ely:

I made thousands of readings.

Q. And to make thousands of corrections would have increased your labor apparently to no use, is that about what you mean?

A. That is the way I handled it, and so considered it. At these lower speeds the corrections on the anemometer is about the same and when you get down to the velocity or speeds shown, there are no definite corrections given, it simply indicates directions and shows there is air moving through there that will turn the anemometer that fast, but it does not show the absolute readings at those lower speeds at all. There should be a correction of between [fol. 708] thirty and forty feet per minute. It does not make any difference, when you get a speed up around 100 per minute, for practical results, whether you have 100 feet per minute, or 125 feet or 150 feet per minute. The requirement for speed is it must be fast enough to keep the temperature throughout the chamber substantially uniform. The speeds I find in the Smith and James Way, in this range, come within that definition.

Mr. Ely: If your Honor please, what are we going to do with the machines in storehouse marked as exhibits?

The Court: Your photographs and the information of these is sufficient.

Mr. Ely: It is understood we will withdraw those machines and produce them if either party wants them.

(The case was then adjourned until April 9, 1934 at 2:30 P. M. when the following proceedings were had with the same appearances as before.)

Mr. Toulmin, Jr.: We would therefore like to offer in evidence, and tender in evidence, the depositions taken on behalf of the defendants of John G. Lieber, L. W. Pitts, C. T. Brewer and Van D. Campbell, together with the ex-

hibits referred to in that series of depositions, as Defendants' Exhibits 22-B, 22-C, 22-D, 22-E, and 22-F, which are photographs of the blower in this prior use.

I will ask the stenographer, before we get away, to mark them. The originals have come in to the Clerk's office and [fol. 709] we will have the originals marked so everything can be checked up.

I would also like to offer the letter of March 26, 1934, of Mr. Hanna, managing agent of the National Commercial & Breeders Hatchery Co-Ordinating Committee, transmitting to our plant the official manual of the Code for Commercial & Breeders' Hatcheries Code, 1934. We had the tentative draft here as Exhibit 72 and I promised to produce the copy officially adopted. I think it would be wise to mark it as Exhibit No. 101.

Mr. Ely: I object to receiving any further exhibits.

The Court: You are substituting?

Mr. Ely: Is it the same thing as the old one?

Mr. Toulmin, Jr.: This is the official copy and in substance it is the same one.

Mr. Ely: I object to it. I do not see any reason for offering it and I object at this late date to putting new exhibits in the case. We have not had time to look at it and have not had time to answer it, and I object to it.

The Court: I think you should first point out to Counsel the differences.

Mr. Toulmin, Jr.: There are no differences, except this is the official code. We had a copy printed by all trade magazines, put in as Exhibit No. 72.

The Court: And this is the official——

Mr. Toulmin, Jr.: This is the official copy and it ought to be put in, in our judgment.

[fol. 710] Mr. Ely: We do not question but that the copy you had is all right, and I see no object in the substitution of the two. I do not know anything about this letter and I object to it.

Mr. Toulmin, Jr.: We think this official letter and the official copy transmitted, saying it is on behalf of the Code Authority should be in evidence.

The Court: How does it add anything to your proof, since the other has been received as the copy of the Code?

Mr. Toulmin, Jr.: Well, because up to this date I have never had any admission from the other side that the copy

we have put in is the official copy of the Code. Now, if they are willing to accept that as the official copy of the Code, that is one thing, but up to this date that has never been admitted by them on this record.

The Court: Well——

Mr. Ely: I certainly object to anything. I do not know anything about this paper which Mr. Toulmin offers to put in and about this letter written by Mr. Hanna, which we do not care about, I suppose it is just a transmittal.

Mr. Toulmin, Jr.: It is just a transmittal letter showing it is official.

Mr. Ely: There is more in that letter than this, your Honor.

The Court: The letter is hearsay.

Mr. Ely: I object to it.

The Court: I do not see anything to it except substituting the original for the copy. Of course, if there are [fol. 711] changes in the phraseology, counsel's attention should be called to it.

Mr. Toulmin, Jr.: Yes, your Honor, as far as I know there are no changes, only that it is an official copy.

The Court: If there are no changes, Counsel will not object to it.

Mr. Ely: If it is exactly the same as the one in evidence, why put it in?

The Court: If it is exactly the same, what is the harm?

Mr. Ely: I do not know that it is exactly the same. Suppose Mr. Toulmin lets me have a look at it.

Mr. Toulmin, Jr.: Here it is. (Code handed to Mr. Ely.)

Mr. Toulmin, Jr.: Now, I have two other things, your Honor. I find that in our answer there was pleaded a patent that we overlooked, as to the state of the art, in connection with our answer to the bill of particulars. That patent is the patent to C. W. Zimmer, No. 1,075,747. We would like to give notice that we are going to discuss this in our brief, and to the Court, on the state of the art, and we think it should be marked in evidence, so that we will have a record copy, and we therefore tender it as our Exhibit No. 101.

Mr. Ely: I object to receiving any further patents. We have had no chance to answer this patent. It should have been put in at the time the case was tried.

Mr. Toulmin, Jr.: We can always refer to the state of the art.

Mr. Ely: I object.

[fol. 712] Mr. Toulmin, Jr.: I think we can.

Mr. Ely: I object to any further evidence in this case.

The Court: I assume the Court has been fairly lenient in the order or reception of proofs, at the time of the reception of proofs, but on the other hand, opposing Counsel should have time to examine and to meet the new questions, if any, raised, and, of course, the evidence is closed there.

Mr. Toulmin, Jr.: You understand this was pleaded in the answer.

The Court: I understand, but no proof was made of it on the trial.

Mr. Toulmin, Jr.: Right, your Honor, like a number of patents we put in, we had no special discussion on them. This was on the state of the art and we would like to have it before your Honor so you will see it. We think it is important for you to see it, and we ask that it be received and Mr. Ely can cover it in his brief, as we will cover it in our brief.

Mr. Ely: I object, your Honor.

The Court: The only thing is, if Counsel takes the position, if it is received, that he needs time to meet the introduction of this proof, why, I might have to consider that; that is all.

Mr. Toulmin, Jr.: The fault is mine. I overlooked putting it in, I confess and avoid, if the Court will let me.

The Court: I am only speaking of the other angle of it, whether he should have time to meet any question that he [fol. 713] claims he can meet in connection with that patent.

Mr. Toulmin, Jr.: I am perfectly willing to let him meet it in any way he wishes.

Mr. Ely: I object to it being referred to in the argument and brief. I object to the patent going in without any chance of our rebutting it in the record. It is a most unusual thing to come in after the proceeding is over and try to introduce any matter, whether deliberately left out, when he has presented his case.

Mr. Toulmin, Jr.: That is not right. In a long, two weeks trial, in preparation, if you overlook any matter, it is not a high crime.

The Court: Has it any specific significance?

Mr. Toulmin, Jr.: Yes, your Honor. I think it is a very important patent to have before the court.

Mr. Ely: Then we should have a chance to answer it.

Mr. Toulmin, Jr.: We are willing to give him the chance.

Mr. Ely: I object to that after the case is all over. And it is understood the case is closed, by both parties, to coming in here and trying to put in new stuff and delaying this case, as it has been delayed.

(Then followed colloquy between Court and Counsel the Court finally saying:)

The Court: Well, the point to my mind is that as long as it was not brought up on the trial, of course, where the wit- [fol. 714] nesses would have been examined, by Counsel on this particular patent, do you think that the Court would be justified in receiving it now, without the opportunity to permit an examination of it?

Mr. Toulmin, Sr.: Allow me to say this, in the first place, Mr. Ely is not taken by surprise.

The Court: I presume that is true, but the Court would not have the information he might want to present on it.

Mr. Toulmin, Sr.: He can put in his brief any criticism or attack he wants to make on the patent and we will do the same thing.

Mr. Ely: Anything I put in the brief is not in the record.

Mr. Toulmin, Jr.: We will join him in any attacks he wants to make on this patent.

Mr. Ely: Mr. Toulmin's day is over.

The Court: I do not think we will receive it at this time.

Mr. Toulmin, Jr.: May I have an exception. We omitted through our own oversight, but it was in our answer.

(Zimmer Patent No. 1,075,747 marked Defendants' Exhibit No. 101 for Identification.)

Mr. Toulmin, Jr.: It was in our pleadings, but overlooked in presentation of the case.

The Court: Yes.

Mr. Toulmin, Jr.: Now, just one other thing. I find, as to the record of Exhibit No. 31 of the defendant, Buckeye vs. [fol. 715] Boling, I borrowed this record, and I would like to substitute a photostatic copy of certain pages of the record, as this is the only copy of the record. The particular pages I want to read in here are pages 185 to 305 and then the pages 384 to 388.

Mr. Ely: I object to the receipt of any further evidence.

Mr. Toulmin, Jr.: There is no further evidence.

The Court: The whole record is offered in evidence. Counsel has a right to use that, but I think, as a matter of convenience, if he has photostatic copies——

Mr. Ely: I do not understand that this record was offered in evidence.

Mr. Toulmin, Jr.: It is so marked on its face, Defendants' Exhibit No. 31, with the stenographer's initials.

Mr. Ely: I beg your pardon.

Mr. Toulmin, Jr.: I merely want to do this, to return it.

The Court: I see no objection to photographing the parts he relies on, and if Counsel wants other parts, he can have them.

Mr. Toulmin, Jr.: I will withdraw it then and refer it to Mr. Ely.

Mr. Ely: I desire to offer in evidence in this case the depositions taken on behalf of the plaintiff in Muskogee, in regard to the so-called Hastings prior use, the depositions of L. A. Corey and Richard Shanafelt, and the depositions taken in New Orleans on the same subject-matter, of F. J. [fol. 716] Ward, and the deposition of Mr. Taggart.

Your Honor will recall that at the close of the proceedings here it was agreed that certain extracts of Dr. Smith's testimony, in various previous litigations, in which he had testified as to the development of the invention, might be added, might be inserted in the record, and I think those have been filed here in court, and in case they have, I wish to offer them formally.

Deposition of Milo B. Hastings

It was stipulated by the parties that in lieu of the originals of all publications to be introduced in evidence as exhibits, photostatic copies may be used, and that said publications were issued and published as of the date appearing thereon, said photostatic copies to be subject to correction if any error appears therein.

Milo Hastings, a witness on behalf of the defendants, testified by deposition at New York, N. Y., Nov. 8 and 9, 1933, as follows, said deposition being offered and received in evidence.

Direct examination.

By Mr. R. A. Greer for Defendants:

I am Milo Hastings, age 49; residence, White Plains Road, Tarrytown, New York. I am a writer, at present. I have had experience in the business or science of incubation [fol. 717] of eggs. I began using incubators as a boy on the farm and had experience with several makes then in use. In the summer of 1902 I secured employment on a large poultry farm in Illinois, and worked there that summer, also using incubators. The same fall I returned to Kansas and entered the Kansas State Agricultural College and was given active and full charge of a flock of poultry maintained by the Kansas Experiment Station. I continued to be in charge of the poultry work at the station during my term in college until graduation in 1906. During this period I also operated several makes of incubators which were then at the station. In the year 1908 and part of 1909 I served as poultry man in the United States Department of Agriculture, and traveled extensively for the Government, visiting poultry plants and various agricultural experiment station operators of incubators and was generally conceded as an expert in this art.

I know of a publication published in this country, called the "Reliable Poultry Journal".

As to the photostatic copy of the issue of April, 1918, of the "Reliable Poultry Journal", Volume 25, No. 22, being photostatic copy of the cover title page and pages 265, 266 and 267 of said journal, an article entitled, "Hastings Mechanical Draft Chick Hatchery", I recognize the article as having been written by me and published on the date mentioned.

Counsel for defendants thereupon offered in evidence the photostatic copy of the April, 1918, issue of the Reliable Poultry Journal and it was Defendants' Exhibit 20.

Mr. Ely: I object to the introduction of the publication as [fol. 718] entirely immaterial, being published sometime subsequent to the filing of the patent in suit, and furthermore as secondary evidence.

Mr. Greer: You mean by "secondary evidence"——

Mr. Ely: Secondary evidence in that it doesn't prove anything with regard to the statements contained therein.

Mr. Greer: You are not objecting to it as secondary evidence on the ground of its being a photostatic copy?

Mr. Ely: No, I am objecting on the ground that the statements contained herein were made sometime after the patent in suit was filed, therefor- it is secondary evidence as to the truth of anything contained in the publication.

In Defendants' Exhibit 20, the April, 1918, issue of the "Reliable Poultry Journal", I mention a book called, "The Dollar Hen." I wrote, "The Dollar Hen", in the year 1909 after leaving the employ of the Department of Agriculture. It was published by the Arcadia Press in New York City.

The book bearing the title, "The Dollar Hen", handed to me is a copy of the book that I wrote, published by the Arcadia Press under the printing date of 1909.

Defendants' Counsel then offered in evidence the book entitled, "The Dollar Hen", and it was agreed that the copy filed of record herein on the injunction motion may be considered as the exhibit now offered in evidence by the defendants. It is marked as Defendants' Exhibit 13. Pages 77 to 107, inclusive, are relied upon.

[fol. 719] In this article in the Reliable Poultry Journal, Defendants' Exhibit 20, I state in substance that during the winter of 1911, I built an incubator in Brooklyn, New York. That incubator was built for Walter B. Davis. This 1911 incubator built and installed in the basement of Mr. Davis' residence on King's Highway on the outskirts of Brooklyn.

Mr. Davis was engaged in the linotyping business in New York City, and as a side interest he operated a poultry farm at his residence in Brooklyn. I met Mr. Davis and interested him in the idea of building an incubator along ideas that I had conceived, the chief distinction of which was using a fan to operate a forced draft to distribute the heat through the incubating chambers.

Mr. Davis employed me at a small salary to come to his poultry farm and reside there and assist him in his poultry work and build such an incubator for him. Mr. Davis had other employment than the operation of this hatchery or poultry farm. Mr. Davis was very busy at the time with his linotype business, and only operated the poultry farm for merely recreation purposes. He had two men on his place, both of them were Negroes, who were doing the labor of caring for these chickens.

I built that incubator beginning in the late months of 1910, and built it early in the winter of 1910 and 1911, for operation in the hatching season of 1911. It was operated by me during the hatching season of 1911. The hatching season is in the spring of the year.. It varies in length according to the purpose of the hatching. In the case of the [fol. 720] work of Mr. Davis' poultry plant, we were incubating only for Mr. Davis and not as a business of hatching for others, and hence it was only necessary to hatch the chickens that Mr. Davis himself wished. The operation there was confined, approximately, to the months of March and April, as I recall.

Mr. Davis was engaged only in operating a poultry plant there. He had quite a large number of hens—I don't remember the number, but I think it was close to a thousand —which he was running on an intensive or largely indoor yarded system, and he was quite enthused with the idea of raising a large number of broilers for sale, but he was not engaged in the business of hatching for others nor in the business of selling baby chicks. His business was then the sale of broilers.

As to the quality and kind of hatch I obtained from this incubator which I built for Mr. Davis in 1911, the quality of any hatch is determined by the hatching quality of eggs. Mr. Davis himself had, for the most part, been recently purchasing from various sources, and in addition he purchased eggs from some poultry farm in New Jersey. He hatched both his own eggs and those that he bought. The hatching quality of those eggs was fair, and we operated in the beginning of the hatching season the incubator that I built and, as a comparison on the side, a Cyphers incubator which Mr. Davis had previously owned. We made this as a comparative test of the hatching of the two makes of incubators. The test resulted in a hatch that indicated that the machine built by me was fully equivalent or slightly better in its hatching abilities than the Cyphers in- [fol. 721] cubator. The hatch, as I remember, was about 59 per cent. of all eggs set. The incubator that I built had a capacity of 6,000 eggs. The Cyphers machine had a capacity of 360.

Over objection by counsel for the plaintiff as calling for a conclusion, the witness said:

From my knowledge and experience in the business, art or science of the incubation of eggs, this incubator, built and installed by me for Mr. Walter B. Davis of Brooklyn, New York, which will hereafter be referred to as the Davis incubator, was a successful incubator, as judged by Mr. Davis and myself, by the comparative hatching test with the Cyphers machines, which was at that time rated as the leading successful incubator in the market.

I have had drawings prepared, illustrating the construction and operation of this 1911 Davis incubator. These drawings are diagrammatic, but accurately show all principles of construction and operation.

Defendants' Counsel offered in evidence the drawings of the 1911 Davis incubator, identified by the witness and the same were marked Defendants' Exhibit 21.

(Objection by plaintiff as not properly proved.)

This Davis incubator illustrated by Defendants' Exhibit 21 consisted of a chamber which was approximately a 6 foot cube; this entire chamber or incubator was insulated with cork insulation. It was entered by a door, which I will mark "A", which led into a small ante-chamber, which I will mark "B", and from this, a door, which I will mark "C", large enough also for a man to enter, [fol. 722] leads into an operating chamber, which I will mark "D"; the incubating chamber proper, which I will mark "E", was accessible from the chamber (D), and consisted of cupboards provided with slides upon which rested the egg trays, which I will mark "F". These egg trays were 40 in number and were arranged in four tiers, each ten trays deep. The trays were square trays, approximately 2 feet square, and slid into chambers approximately 2 feet by 4 feet, the one tray in each slide being behind the other, so that it was necessary to remove the forward tray for pulling out the rear tray. This incubating chamber was entirely open across the top, and likewise entirely open across the bottom. Except for the air leakage between the front edges of the tray, the incubating chamber (E) was closed off from the compartment (D). I now mark as "G", a compartment at one side of this incubating chamber. The compartment marked "G" contained the following devices: A heater which I will mark "H", for burning gas, and a thermostatic device, which

I will mark "I" for controlling temperature by regulation of the gas flame. This chamber also contained a motor-driven fan, which I will mark "J", operated by a motor, which I will mark "K", which was outside of a chamber. The chamber also contained a moisture pan, which I will mark "L". The means of operating this incubator was by heating the incubating chamber and maintaining an equitable temperature throughout that chamber by means of a forced draft or current of air which was blown into the top of the egg chamber and distributed over the area, and this air from the impelling force of the fan behind it, [fol. 723] was then driven down through the incubating chamber into the open space beneath the egg trays. The air was driven through the trays and the eggs of the entire chamber. The air was then drawn by the suction of the fan through the heater, and was returned by the fan into the top of the incubating chamber, making a complete or closed circuit of air through the incubating chamber, the heater and the fan. This circuit of air was continuous and rapid, or a forced circulation of draft, but as it was necessary, in the art of incubation, to provide sufficient exchange of air to furnish oxygen to the living embryos and the hatching chicks, and to eliminate the gases of carbon dioxide, this ventilation or slow change of air was attained in this incubator by the filtering or slow diffusion of air into the chamber containing the heater and the fan, which ventilation was secured through doors or panels, which I will mark "M". These were frames covered with a porous fabric, which I believe was burlap. The further rate of the exchange of this air from the outside was adjusted or regulated by the slight opening or adjustment of the door "A" leading to the outside. The air circuit returning from the egg chamber passed over the moisture pan (L) so that the humidity of the air could be increased and controlled by the evaporation of water in the warm air current as furnished by this moisture pan (L).

These drawings that I have just identified and marked Defendants' Exhibit 21 were made quite recently. I am referring to the Davis hatchery as operated by me in the year 1911. These drawings illustrate that incubator. The arrows appearing on these drawings are meant to show [fol. 724] the circulation of the air currents as impelled by the forced draft of the fan.

In figure 1 of the drawings, Defendants' Exhibit 21, is an opening in the upper right-hand portion immediately under the figure 3 with arrows coming through it. That opening was the exit or outlet opening of the fan (J).

As to there being any separation of the chamber in which the heating element and the fan were located, from the chamber where the egg trays are situated, there is a complete separation at the top of those chambers, except for the closed outlet opening from the blower or fan, but at the bottom of the incubating chamber there is a larger and open free passageway into the chamber containing the heater and the fan. The air circuit as shown in the drawings is from the fan into the incubating chamber, then diffused among the eggs and forced to descend vertically to the lower part of the chamber, from which it is free to then pass into the chamber containing the heater and the fan and moisture pan, and also provided with the openings for ventilation or exchange of oxygen and carbon dioxide. This chamber, therefore, is freely open to the egg chamber, but no air would flow from the chamber back into the egg chamber at the bottom because of the impelling force of the pressure of the blower or fan. The return of the air would be through the heater and through the fan and into the top of the egg chamber.

As to the lines on the drawings in the door marked "C", it was also made a fabric door like the smaller doors marked "M". The purpose of the door (C) was merely to prevent a too rapid exchange of air or drafts when the [fol. 725] door (A) was opened for the attendant to enter to take in eggs or take out chicks. Hence the door (C) could be closed while the door (A) was open. It was made a fabric door merely for the purpose of giving ample ventilation to the chamber (D) in which the attendant would be working. The door (C) and the exchange of air from the outside, and the chamber (D) are of no particular significance in the hatching of eggs, as this was merely the work chamber, but it was not entirely closed off from the incubating chamber, there being cracks between the front of the egg trays, but the active circulation of air, impelled by the fan was as shown by the arrow. Any exchange of air from the incubating compartment with the chamber (D) in which the attendant works was incidental and no part of the plan of incubation.

Figure 1 of Defendants' Exhibit 21 represents what is called a phantom drawing, showing the essential arrangement of the parts of the whole.

Figure 2 is what is called a floor plan. It is a horizontal cross section at a higher level than the floor. The level of this is shown on the phantom drawing and marked "2". I will mark on figure 2 the corresponding parts that I have marked on figure 1, with the same letters as shown in that view.

Figure 3 represents an elevation or side view of the chamber containing fan, heater and moisture pan, of the Davis incubator of 1911.

Figure 4 is a side view or elevation, taken at right angles to that of figure 3 of the same Davis 1911 incubator. I have also similarly marked the drawings referred to as "Fig. 3" [fol. 726] and "Fig. 4". I also have similarly marked a copy of the drawings which have been introduced in evidence as Defendants' Exhibit 21.

Defendants' Counsel then re-offered in evidence over objection by plaintiff the drawings as identified and marked by the witness, as Defendants' Exhibit 21.

Referring to Defendants' Exhibit 21, the heater of this incubator consisted of a gas flame, burning at the base of a pipe, which is enclosed in another and larger pipe so that the gas fumes, combustion, pass through this pipe and to an exit leading outside of the incubator, while the air that is drawn into the fan and circulates in the incubating chamber, is drawn through a larger pipe surrounding this heater pipe. This larger pipe surrounding the heater pipe was about 6 inches in diameter.

The inlet or outlet openings for the air, in the incubating air circuit, were primarily through the controlled or regulatable devices shown at "M", operated in conjunction with the opening of the outside door (A). This was the planned ventilating or air exchange. There would be a supplemental exchange of air to a certain extent through the fabric door (C), and through the incidental passage of air into the incubating chamber from the antechamber (D).

The means provided in this Davis 1911 incubator for supplementing or adding to the moisture of the air is from evaporation of water in the moisture pan (L), but the conserving of moisture in the air would mean the checking of the rate of loss of moisture from that air. In incubation,

in addition to the natural moisture of the fresh air as brought in from the outside air, you would have the further [fol. 727] source of moisture added to it that comes from the evaporation of moisture from the eggs or from hatching chicks, but in addition to these two sources of air moisture, it is considered and was considered good practice, in the art of incubation, at the time of the operation of this Davis hatchery, to provide for added moisture which might be controlled by the operator, according to the apparent needs for greater or less moisture in the incubator as indicated by the rate of loss of moisture, shrinkage of the air cells, or by the appearance of the embryos of the chicks at hatching time.

"L" (Fig. 3) is a moisture pan for evaporation of water in the warm air stream, to add to the moisture as desired. The fan used there was a centrifugal fan of the blower type.

After the end of the hatching season in Brooklyn, I prepared a circular describing this Davis 1911 type of incubator and other matters of poultry development in which I was interested. I printed this circular with particular reference to the promotion of poultry work by means of large incubators or hatcheries, for the Kansas and Oklahoma gas district. My reason for particular interest in the development of the industry in that region was that Kansas was my home state and my brother was a resident of Independence, Kansas.

The publication was used by me in an effort to interest poultry men or others in the development of an incubator hatchery, and related poultry development, and I went, in the summer of 1911, to Kansas, and spent about a week's time at Topeka, Kansas, in the company of Rees V. Hicks, former president of the Poultry Association, who at that [fol. 728] time was editor of a poultry paper published at Topeka, by the name of "Poultry Culture". I also spent time at Independence, Kansas, my brother's residential town, attempting to interest local men there in the same project, and from there went to Muskogee, Oklahoma, with the same idea in mind. I probably circulated a number of these phamphlets at all these points.

As to whether that Davis 1911 incubator was open for observation to the public, or whether anyone ever inspected or saw it there in operation, it was operated for Mr. Davis and his own hatching uses. During the time it was operated, it was shown to a number of my personal acquaint-

ances, and also friends and callers who called upon Mr. Davis.

With reference to the building and installing of an incubator at Muskogee, Oklahoma, in the fall of 1911, I interested, particularly a man by the name of John Lieber. Mr. Lieber was an attorney of the City. He also owned four moving pictures, and was quite a prosperous and leading spirit of the community. He also owned a farm and was generally interested in the development of the poultry industry of his community. He was not an operating poultry man at the time I met him at all. Mr. Lieber employed me to build an incubator or hatchery for him. This work was begun in the late fall of 1911 and the incubator was built in the winter of 1911 and 1912. That incubator was operated by me for Mr. Lieber, as owner, during the hatching season of 1912.

The character of the business done with that incubator was quite different from that of the Davis hatchery, in that [fol. 729] neither Mr. Lieber nor myself owned any poultry farm, and it was our idea to rapidly stimulate the development of the poultry industry in that region of the State, by doing what is known as custom hatching, although we also bought some eggs and sold the chicks hatched therefrom.

The term "custom hatching" means that the operator of the incubator or hatchery solicits eggs from owners for the purpose of hatching the chicks, charging for the service of hatching a fee, which is usually based upon the charge per egg or per chick hatched. That was the character of business chiefly done in that business season of 1912 by this incubator at Muskogee.

The Muskogee incubator, like the Davis incubator, was built in, and the walls attached to an existing building. In this case, the incubator was considerably larger than the Davis machine and occupied most of the space in the building in which it was installed. This building was a low brick building, partly sunken in the ground—a sort of semi-basement. It was owned by Mr. Lieber. It was in the rear of other buildings owned by him, located right near the heart of the business district of Muskogee. The general plan of construction and the principle of operation were quite similar and in accord with those of the Davis incubator, such changes as were made were wholly the matter of expediency in adapting the construction of the building space available and because of the larger capacity of the Musko-

gee incubator. This capacity was rated as 30,000 eggs, and the incubator was consisted of essentially the same number [fol. 730] of chambers and with essentially the same arrangement of parts as in the Davis incubator. The chief distinction was that because of the larger capacity of the Muskogee incubator and the greater distance through which the incubator consisted of essentially the same number of egg trays through which it had to be equitably distributed and circulated, caused me to depart from the construction of the Davis machine in the particular that the air driven from the fan was caused to pass through a rear passageway behind the incubating chamber. This was for the purpose of preventing a cold wall along a brick ground wall, and to more equally distribute the temperature throughout the longer series of hatching compartments. The heater in this case was located in a vertical side chamber which was at the opposite end of the incubating compartments from that of the fan. The separation of the heating member from that of the fan chamber had no particular purpose except that of convenient construction and because of the greater length of the incubating chambers it was thought advisable to place the heat at the further, or what appeared to be the cooler end of the machine.

Aside from the location of this heating arrangement, there was no essential difference in the means of heating the air, between the Muskogee incubator of 1912 and the Davis incubator of 1911.

I have had drawings prepared to illustrate the construction and operation of this Muskogee 1912 incubator. The set of drawings handed me, consisting of two sheets, one sheet marked "Hastings Muskogee Hatchery, 1911-1912, [fol. 731] Fig. 1", and the other sheet marked "Hastings Muskogee Hatchery, 1911-1912, Fig. 2, Fig. 3, Fig. 4 and Fig. 5", correctly represent the construction and operating principles of the Muskogee hatchery of 1911 and 1912 as that hatchery was completed and utilized during the main portion of the hatching season, and as the plant was when I left it. Those drawings have been quite recently prepared.

Counsel for defendants then offered in evidence the drawings identified by the witness, of the Muskogee 1911-1912 incubator, as Defendants' Exhibits 22 and 22-A re-

spectively, Fig. 1 being Defendants' Exhibit 22, and Figs. 2, 3, 4 and 5 being Defendants' Exhibit 22-A.

(Objection by plaintiff's counsel on the ground that the drawings had not been properly proved.)

(Recess taken to 1.30 P. M.)

Fig. 1 of Defendants' Exhibit 22 is a phantom view of the Muskogee 1912 incubator.

Fig. 2 of Defendants' Exhibit 22-A is a horizontal section; Figure 3 is a vertical section shown from the left end of the phantom drawing; Figure 4 is a longitudinal vertical section; and Figure 5 is an end vertical section from the opposite end of that of Figure 3.

I will take these drawings, Defendants' Exhibits 22 and 22-A, and describe in detail the various elements or parts of this Muskogee 1912 incubator illustrated by those drawings and will mark on the drawings the reference letters identifying the various elements and parts shown on [fol. 732] the same. A door entering into the hatchery is shown and marked "A". This leads into an antechamber marked "B". A further door marked "C" leads into a workroom or chamber marked "D". The incubating chambers, of which there are seven, are indicated by the letter "E". The individual trays that slide into these chambers, one of which is marked "F"; a chamber marked "G" contains a blower or fan, which fan is marked "J". At the opposite end of the hatchery is another chamber marked "G-1". This contains a heater marked "H". A thermostat, which I will mark "I" is shown in Figure 1 and Figure 5 only. The blower or fan is marked "J". At the position in the Figure 2 which I have indicated by "K", is a motor which is not shown in drawing, but the belt leading from the fan to the motor is shown. I will mark it "K-1". A moisture pan is marked "L". A door leading to the chamber (G) is marked "M". A passageway behind the incubating compartments, through which the air from the blower passes, is marked "N". A passageway through which the air also passes and is distributed to the seven individual hatching compartments is marked "O".

Referring to Defendants' Exhibit 22, Figure 1, of the Muskogee 1912 incubator, the buttons appearing on the drawing at the top of each of the incubating chambers, there being seven, one of which I will mark "P", are for

the purpose of holding a removable panel or door which was set in front of each chamber, after the eggs were put in, to close the chamber off from the workroom marked "D". The panels or removable doors are shown, and I will mark them "Q". The arrows on all these drawings [fol. 733] indicate the circulation of forced draft current of air impelled by the fan.

Looking at Exhibit 22, Figure 1, of the Muskogee 1912 incubator, the openings at the top of the egg chambers with movable slides, which I will mark "R", are seven in number and lead from the chamber (G) into the seven individual hatching or incubating chambers. The purpose of these openings, and the adjustable slides, is to permit of the distribution of air from the forced draft of the fan to the individual hatching chambers, and the slides are for the purpose of adjusting the flow of the air to each hatching chamber, as operation requires; thus, if a portion of the hatching chambers only are to be used, these slides would be open to those chambers, and other chambers not in use might have the slides closed to prevent the by-passage of air through idle chambers. The further purpose of enclosing the top of the incubating chambers, which was not done in the Davis plant, and was done in the Muskogee plant, is because of the much greater size of the Muskogee plant and the necessity of having some means to equalize the flow of air through the larger number of chambers distributed through a much greater range of space.

Regarding the dimensions of the chamber in which the fan or blower was located, in this Muskogee incubator they were approximately 4 by 5 feet—the horizontal dimensions. The blower forced the air through a partition into which the outlet of the blower was fitted, and the air flow was immediately diverted by a rounded tin partition to reduce the resistance and turn it into the passageway or chamber marked "N". This passageway merely serves as a conduit [fol. 734] for the air, the purpose, as I have previously stated, was to avoid a cold wall and the expense of greater insulation at the back of the hatching chambers.

As to the approximate dimensions of that air chamber and channel marked "N", the channel had the vertical height of the incubating chambers in front, and in the other dimension was quite narrow, being about 8 inches in width and extending the length of the entire plant.

As to the dimensions of the heating chamber which is marked "G-1", that chamber was about 4½ feet in depth, it extended the full height of the incubator, and was quite narrow the other way, there being only room for the air to pass around the heater, which was formed of a 6 inch stovepipe. Provision was made to reach in and adjust and attend the flame of the heater through the front of that chamber. That is indicated in the drawings. The entrance-way consisted of a slender vertical panel which I will mark "S".

With reference to the means provided for separating this heating chamber (G-1) from the egg chambers, the heating chamber was lined with metal, and between this metal and the slide of the adjacent egg chamber, asbestos insulation was provided, which I will mark "T".

The manner and method of the operation of this Muskogee incubator was the same as that of the Davis incubator, in that the distribution of the heat to provide equal temperatures throughout all egg chambers, was carried out by means of the forced draft of air as propelled by the fan and past the heater, and then distributed in a long chamber marked "O" to the seven separate incubating cham- [fol. 735] bers marked "E". In these chambers the air which entered at the top was driven by the forced draft vertically down through the egg trays the same as in the Davis plant, and was returned by a similar open space beneath the trays to the fan, from whence the circuit passed the heater or continued on a complete continuous circuit as in the Davis plant.

The size of the fan or blower indicated in these drawings was that of a Sirocco blower, with an 8-inch outlet. The blower indicated on the drawings which I have described, was used in the Muskogee plant. It was not the first fan or blower that I installed there. In installing this plant I first installed an open blade Davidson exhaust fan which Mr. Lieber had in stock, it having been used as an exhaust fan in some of his moving picture theatres. I found, however, upon trying it out, that the exhaust fan did not have a sufficient pressure blast of air to give a satisfactory circulation to distribute the air through so many hatching chambers, and therefore replaced it with the blower which gave a more forced draft of air with sufficient pressure to overcome the friction imposed in the air circuits.

The manner and method in which this machine, as illustrated in the drawing, was operated where the manner and method that was actually practiced in the Muskogee incubator. The change of fan that I have described made no difference whatever in the circulation of the air through the various passageways and chambers as here shown. The installation of the blower was made because the other fan did not give a sufficient force to operate the machine on [fol. 736] a large scale after friction was introduced into the chambers by the insertion of many eggs, so as soon as we found this out from a trial, we secured the blower, and the blower was used during most of the hatching season, all except some early trial hatches in the beginning of the season. The change was made while the hatchery was in operation but before the main hatching work of the season was under way.

We obtained our source of power for the operation of this fan or blower from a Central current power. The first fan installed was a direct-connected fan, and the blower was a belted fan requiring a separate motor, and to get room for a larger motor and separate fan required some mechanical readjustment in the structural walls of the chamber (G).

The heater, as shown, for heating the air was a gas flame burning at the base of a vertical 6 inch stovepipe, the heater drawing its air or combustion from the channel air circuit of the incubator and exhausting the fumes of combustion, and the air drawn in through the stovepipe which led outside of the incubator.

There were seven egg chambers in this Muskogee incubator. A space and slides were provided for twenty trays. These twenty trays could all be filled with eggs during the incubating period, but the vertical spacing of these trays was only 2⅝ inches, hence when it was desired to bring off a hatch, it was necessary to use the space occupied by two trays for incubating, and the same trays were used, but temporary cardboard siding, which was provided to keep the chicks from falling out, making that tray about 4½ inches in height.

[fol. 737] With that manner of operation the egg capacity of that incubator is rated as follows: The complete space for trays for incubation consists of twenty trays in each of seven compartments, which would give 140 trays. The tray capacity of eggs was 250 eggs, as we rated them; that

would give a total room for 35,000 eggs, but because of the necessary practice of using the space of two trays for hatching purposes, we allowed a loss of 5000 of the full rated egg capacity, and rated the hatching capacity as 30,000.

Going back to Defendants' Exhibit 22, Figure 1, of the Muskogee incubator of 1912, I have marked the pipe of the heater (H). The extension of the heater pipe, which I will mark as "U", is for the purpose of leading the gas fumes of the burning flame outside of the entire hatchery. The pipe passes up through the heating chamber, which is in the incubating air circuit, and then turns and passes overhead through the work chamber (D). That was merely a matter of convenience, and had a further use, that the exhaust heat from the pipe served to take some of the chill off the workroom. The workroom in this incubator was not insulated as the similar workroom in the Davis hatchery, it being larger and the expense of insulation being quite an item, and in this incubator the incubating compartments have panel doors, as I have described, to shut off the incubating chambers more completely than in the Davis machine. Therefore, the chamber (D) was not brought as near the incubating temperature as the Davis hatchery, but the supplemental heating from the conduction and air leakage of the incubating chambers, plus the supplemental heat-[fol. 738] ing from the exhaust pipe of the heater, served to maintain this work chamber at a temperature of about 80 degrees.

At the peak of our hatching season we had the capacity of the Muskogee 1912 incubator so fully in use that on a few occasions we had to hold eggs for a day or two before we had space for them in the incubator. I cannot say that an exact number of 30,000 eggs was in incubation at one time, because we were doing a large amount of custom-hatching, a great deal of it from farmers and small back lot poultry men, who would bring in a few eggs at a time, and in putting these in trays, to avoid mixing lots, we sometimes ran slack trays which might have lowered the full rated capacity somewhat.

That use of it was of a commercial character in the sense that all hatching we were doing was either custom-hatching, which formed by far the bulk of it, or some hatching which we did of eggs that we purchased and the chicks of which we sold.

In the operation of this machine, the egg trays consisted of a frame with a hardware cloth wiremesh bottom, and the eggs were laid loose on their sides in these trays and were turned by hand by rolling the eggs in the tray as was then customary in the incubation practice.

Over objection as calling for a conclusion, the witness testified:

As to what was considered in 1911 and 1912 as a good percentage of hatch in mechanical incubators, I do not think that one can give any set figure as being good hatch. It is purely a matter of phrasing an opinion. The hatching of eggs then, as now, varied widely with the factors of the [fol. 739] quality of the eggs as determined by breeding stock, by the incubation, by the season of the year and many other factors.

The quality of hatches in the Muskogee 1912 incubator were very highly variable, and rated all the way from complete failures of small lots, to back lot winter eggs that were brought in by local poultry men, to excellent hatches that were secured from eggs of a good hatching quality provided by more skilled poultry men. I best recall the hatching percentages of white leghorn eggs that I purchased throughout that hatching season from a man named Gaunt who resided at Benton, Arkansas. I found from an early trial of these eggs that they were good hatching quality, and hence, for purposes of producing chicks for sale, we bought throughout the season an average of two cases a week, and these eggs hatched uniformly well throughout the season, and the hatching percentage never fell, with the Gaunt stock, below 70 per cent. of all eggs purchased.

The operation of this Muskogee 1912 incubator was decidedly open to the public because it was considered by Mr. Lieber and myself as something of an advertising scheme of my method of hatching, and for Mr. Lieber's desire to develop and interest the people in the region, and he therefore advertised the hatchery. I particularly recall that Mr. Lieber had slides made of views of the hatchery which he used in his moving picture houses, with an invitation to the public to come and visit the mammoth incubator. This resulted in our having a great many visitors who were freely admitted to the hatchery, as well as all customers [fol. 740] supplying us with custom-hatching eggs who were invited to come in and see the machine in operation, and

it was fully demonstrated and discussed with any visitors who came.

Over objection by the plaintiff as calling for a conclusion, the witness said:

From my knowledge and experience in this art of incubating eggs, as well as from my knowledge of the actual operation of the Muskogee incubator in 1912, the operation of the incubator was successful. The hatches, as I have stated, varied widely from very poor to very good results, depending on the quality of eggs which were highly variable in that new community, and in which many poultry producers had very little knowledge of the industry.

With reference to the complete failure of some hatches, I remember one instance of a complete failure to hatch any chicks from eggs brought. I remember this particularly well because a breeder, who had a very small number of large black Orpington chickens, which he highly valued, brought some eggs early in the season to hatch, and we failed to get any chicks from them, and I recall that instance because of the particular case that the man valued his stock and was naturally very greatly disappointed. The fact that the incubator at the same time was bringing good hatches from other eggs and continued to do so throughout the season, convinced me that the fault was not in the incubator but in the eggs. The eggs were not hatchable.

There were a number of notices in local and farm papers with regard to building and operating this 1912 Muskogee incubator.

The document handed me is a photostatic copy of "Poul- [fol. 741] try Culture" published at Topeka, Kansas, February, 1912", No. 5. It contains an article which is a description of the plant as I had built it, and which shows in its illustrations, the first hatch which was taken in that plant in the month of January, 1912. The article is prepared and signed by Ralph H. Searle, associate editor of "Poultry Culture", the editor in chief of which was Reese V. Hicks.

Defendants then offered in evidence as Defendants' Exhibit 23, the article identified by the witness as having been published in the February, 1912 issue of the "Poultry Culture".

Defendants' Exhibit 23, contains a photograph on page No. 7, in the center of the article of my workman or assistant who was employed in this hatchery. The photograph of myself is in the lower part. The photograph in the upper righthand corner of the article shows one of the individual incubating compartments with most of the trays removed to show the construction of the compartments, and trays shown in the lower part of the compartment of the Muskogee 1912 incubator.

Upon examining Defendants' Exhibit 23, I am familiar with the article by looking over it now. I recall it essentially as my memory of it then was, and consider it a very fair and accurate description of the 1912 Muskogee plant as then built.

Defendants' counsel then offered in evidence a photostatic copy of the index cover page, and pages 630 and 631 of the November, 1912 issue of the "Popular Mechanics Magazine" as Defendants' Exhibit 24.

The photograph that appears on page 630 of Defendants' Exhibit 24 is my own photograph shown taking off a hatch [fol. 742] of chicks in the Muskogee 1912 plant. On page 630, Defendants' Exhibit 24, in the first line of the article there, mention is made of a 30,000 egg electrical hatchery at Muskogee, Oklahoma. Quite evidently it refers to the hatchery I built and operated there for Mr. Lieber.

There was not any other hatchery in Muskogee at that time, of 30,000 egg capacity.

Referring to Defendants' Exhibit 24, the beginning of this article refers to the general idea of raising chicks by electricity, as interpreted by the writer, and refers, in addition to the use of electricity in operating the fan, and that of the use of electric lights with newly hatched chicks. That has no direct relation to the hatchery or incubator. The latter part of this article is a brief but accurate description of my Muskogee plant.

Defendants' Counsel then offered in evidence a blueprint copy of the July 6, 1912, issue of "Electrical World" as Defendants' Exhibit 25.

In Defendants' Exhibit 25, the 30,000 egg incubator that article mentions is my Muskogee Plant, and the one picture used to illustrate it represents myself. The other picture,

Fig. 2, is a picture of the Davidson exhaust fan which was used at the beginning of the season, in the Muskogee incubator, as I previously described.

Mr. Norman B. Hilcox was associated with the local electrical company in Muskogee, from which we secured our electrical power, and he was greatly interested in this new use for electricity. I knew Mr. Hickox personally.

Counsel for Defendants then offered for identification Defendants' Exhibit 26.

[fol. 743] Mr. Ely: I don't see how he can testify about it, he doesn't know anything about it.

Mr. Greer: I will connect it up later.

Mr. Ely: I object to it. I don't see why you ask Mr. Hastings about it.

Q. Answer the question.

Mr. Ely: I object to the question as obviously improper.

(Question repeated.)

Mr. Ely: I object. Obviously the article speaks for itself unless Mr. Hastings knows something about the article or whatever he is to read there. I object to the question.

On page 1 in this album, which has been marked for identification as Defendants' Exhibit 26, I find a typewritten article describing the 30,000 egg incubator built and operated by me in Muskogee in 1912. I have now read this article and find it to be a very excellent and accurate description of that incubator.

The other document handed to me is another typewritten copy of the same article to which I have just referred. That article gives an accurate description of my Muskogee 1912 incubator as it was built and operated.

Defendants' Counsel then offered the copy of the article on Page 1 of Defendants' Exhibit 26 for Identification, as Defendants' Exhibit 26-A.

(Objection by plaintiff as authorship or source of article not proved.)

[fol. 744] On page 82 of the album marked for identification as Defendants' Exhibit 26, are shown two original photographs taken in my Muskogee 1912 incubator; the one

at the left shows myself handling eggs; the one at the right is a close-up and showing a thermostatic and gas-regulating device.

The two photostatic copies of this page 82 of the album marked for identification as Defendants' Exhibit 26, are photostatic copies of the original photographs on page 82 of the album.

Defendants' Counsel then offered in evidence the photostatic copies of the photographs appearing on page 82 of Defendants' Exhibit 26 for Identification, as Defendants' Exhibit 26-B.

(Objection by plaintiff as not proved.)

Those photographs were taken early in the hatching season—the winter of 1912 in the Muskogee plant at Oklahoma.

Q. Did you state that they were taken in 1912?
A. In my Muskogee 1912 incubator.

On page 83 of this album marked for identification as Defendants' Exhibit 26, there appears a copy of an article from the "Electrical World" of July 6, 1912, and a separate pasted picture of a chicken in a man's hand. That is the original of the article of which a photostatic copy was offered in evidence as Defendants' Exhibit 25. That article, as it appears in the album marked for identification as Defendants' Exhibit 26 refers to the 30,000 egg incubator in Muskogee, Oklahoma, that I built.

The photographs on page 84 of the album, Defendants' Exhibit 26 for identification, the one at the left shows a [fol. 745] photograph of the Davidson exhaust fan in place, as used at the beginning of the operation of my Muskogee incubator; the photograph on the right shows a view of the work chamber, which is marked "D" on the drawings that I submitted. In this photograph, the panel doors are in place in front of all of the egg chambers except one in the center. In this, the panel door is removed and is shown set aside. The photograph shows me placing a tray of eggs in the incubating chamber.

The documents handed me are photostatic copies of the two photographs which I have just described.

Defendants' Counsel then offered in evidence the two photostatic copies identified by the witness, as Defendants' Exhibit 26-C.

(Objection by plaintiff as not properly proved.)

Q. I will ask you to look at the album marked for identification as Defendants' Exhibit 26, page 84 thereof, and the photostatic copies of the two photographs appearing on said page 84, offered in evidence as Defendants' Exhibit 26-C, and I will ask you, further, to take the drawings of the Muskogee 1912 incubator, which have been offered in evidence as Defendants' Exhibits 22 and 22-A, and state whether or not the elements or parts of the Muskogee incubator shown in those photographs are illustrated in those drawings, if so where and in what way, and how they are lettered on the drawings?

A. The photograph showing the fan shows the chamber which, in the drawing, is marked "G", and it also shows on [fol. 746] the floor a moisture pan, which in the drawing is marked "L". The fan shown in the photograph is the one which I have described which was first installed. The drawing shows, in the same chamber (G) a blower which was used to replace the fan which was first installed and which is shown in the photograph.

Q. What as to the other photograph?

A. The other photograph is a photograph of the chamber, which in the drawing is marked "D". It was taken by a camera which was located in or beyond the doorway at "C", and shows the fronts of the incubating compartments with the six of the removable panel doors which in the drawings are marked "Q" in place and the one removed. At the top of these panels in the photograph are the buttons which are indicated in the drawing and marked "P". In the background of the photograph is shown a stovepipe crossing the rear of that chamber, which is the stovepipe or exhaust from the heater which is marked "U" in the drawing.

The figures 2 and 3 appearing in the photographs are numbers that are placed on those doors or panels and above the spaces where they go, merely to indicate which door fits in which panel, as they were individually made and some didn't fit in other places quite, due to roughness in carpenter work.

The little thing indicated immediately above the head of the man taking the tray out, in that photograph was some electrical device that I recall as being used in connection with the operating of the light. It had no part in the control or construction of the incubator itself.

On page 85 of the album, marked for identification as [fol. 747] Defendants' Exhibit 26 appears to be an article from the "Popular Electricity Magazine". It shows illustrations that are made from photographs which were taken of that plant by retouching or redrawing them. In two of these illustrations I appear. I have no personal knowledge of the appearance of this article.

Fig. 2 on page 85 of the album marked for identification as Defendants' Exhibit 26, is an illustration very clearly redrawn from the original photograph which I have previously discussed on page 84 of this same album. The original photograph is a picture made in the 1912 Muskogee incubator and of me, myself.

There is no difference between the illustration shown on that page 85 and the original photograph except that the original photograph is a dim copy, and probably the publisher did not think it would reproduce well as a half-tone, and therefore he has had his local artist in his own office redraw it. He has made no essential changes in the structure of the incubator. He simply used his imagination a little in drawing in the wood frames and constructions of those panels, which are dim, due to over-exposure of the white surface in the original photograph.

It correctly illustrates that portion of the Muskogee 1912 incubator.

The illustration shown under the marking "Fig. 3" in that article is a half-tone of a retouching of the original photograph on page 84, of the fan. It correctly shows the type of fan and its position. The retouching of the photograph or redrawing leaves out some details but it correctly shows the fan.

The illustration, "Fig. 4" in this article, is a similar re- [fol. 748] touching or redrawing from a photograph of one of the incubating chambers in the Muskogee incubator.

Turning to page 86 of the album which has been marked for identification as Defendants' Exhibit 26, the photograph on the lefthand side of that page represents a view of the workroom of the Muskogee incubator; it has been

arranged for purposes of photography, to make a display showing the large amount of eggs that were in incubation in a small space. For this purpose the entire group of panel doors that are placed in front of the chambers have been temporarily removed and are set aside and shown in the rear of the photograph. The egg trays have been intermittently pulled out at various distances. Some of them are in place and some partly out merely for photographic purposes to show the large number of eggs in process of incubation. That photograph was taken in the plant in the midst of the hatching season of 1912. My statement will apply to both photographs, as far as the time of taking.

The photograph on the righthand side is a photograph of an individual egg chamber, with the top group of trays removed, the bottom group in place, in order to show the construction of the chamber and the way the eggs are placed therein.

The document handed to me is a photostatic copy of the two photographs I have just described in the album.

Defendants' Counsel then offered in evidence photostatic copy of the two photographs appearing on page 86 of the album which has been marked for identification as Defendants' Exhibit 26, as Defendant's Exhibit 26-D.

[fol. 749] (Objected to as not properly proved.)

On page 87 of the album marked for identification as Defendants' Exhibit 26, there appears to be a newspaper clipping which I remember as having appeared in a local Muskogee newspaper. It appearped while I was in Muskogee, at sometime in the season of 1912.

Defendants' Counsel then offered in evidence photostatic copies of the article identified by the witness, as Defendants' Exhibit 26-E.

Referring to this article appearing on page 87 of the album marked for identification as Defendants' Exhibit 26, it is a newspaper article, and it commingles statements regarding the incubator that I was then building or operating in Muskogee, with very general statements about incubation and hatcheries and poultry business. Insofar as the statements relate to my incubator, in the main they are accurate. I observe that there are some slight errors. For instance, the egg tray capacity here is stated as 300 eggs.

while we rated these at 250. The egg tray capacity with eggs laid loose is no exact size, and the reporter undoubtedly got the impression we could put more eggs in, or merely made an exaggerated statement of our rated capacity.

Turning to page 88 of the album which has been marked for identification as Defendants' Exhibit 26, the photographs appearing on that page are original photographs taken in my Muskogee incubator in 1912. The one at the left shows a view of the working chamber with one compartment open and myself taking off newly hatched chicks from the tray. In the rear of this is shown the exhaust [fol. 750] heater pipe going through this chamber. The photograph at the right shows one of the incubating chambers, taken from the front, with the door removed and the upper trays removed. A hatch of chicks is shown in the tray left in, in position, and above, dimly seen in the photograph, is the opening with the removable slides with which we regulated the flow of air into the chambers.

Those photographs were taken early in the hatching season of 1912 in my Muskogee incubator.

With regard to the tray shown in the illustration, with me taking the chicks out, that tray shows that cardboard side temporarily tacked in the tray for the purposes of bringing off the hatch. The space that the chicks and this cardboard side occupy, when slid into the compartment, is shown to be that of the space of two trays, the slide of the removed trays shown in the photograph.

The document handed to me is a photostatic copy of the two photographs on page 88, as now appearing in the album. This photostatic copy shows the photographs on alternate sides to which they are now placed in the album.

Defendants' Counsel then offered in evidence the two photostatic copies of page 88 of the album which has been marked for identification as Defendants' Exhibit 26, as Defendants' Exhibit 26-F.

(Objected to by plaintiff as the original had not been proved.)

Turning to page 90 of the album which has been marked [fol. 751] for identification as Defendants' Exhibit 26, the photograph on the left of this page is that of a freak chick which got its head out of the egg and the fuzz dried before

the chick hatched, and also of an older chick. I merely remember this as a picture that was taken of chicks hatched in the Muskogee plant in 1912. The picture on the right shows two full trays of chicks, which I can identify from the construction of the trays as well as from memory of the photographs taken at that time, of being of chicks hatched and in the trays in my Muskogee plant in the season of 1912.

These photographs were taken during the hatching season in Muskogee in 1912. As to what connection those photographs had with my incubator in 1912, they show that the chicks were hatched therefrom and these were merely photographs for publication or use. One of them is a freakish photograph and the other is of a nice hatch of chicks in trays.

The document handed to me is a photostatic copy of the two photographs just described.

Defendants' Counsel then offered in evidence photostatic copies identified by the witness of page 90 of the album marked for identification as Defendants' Exhibit 26, as Defendants' Exhibit 26-G.

(Objection by plaintiff repeated.)

Defendants' Counsel then offered in evidence a book entitled, "The New Egg Farm", by H. H. Stoddard, as Defendants' Exhibit 14, with particular reference to pages 299 to 303 inclusive.

I am very familiar with this book, "The New Egg Farm", Defendants' Exhibit 14, as I owned a copy of [fol. 752] the original edition published in 1899. The copy I now have in hand appears to be a later reprint of the reprint date of 1920, but insofar as my memory serves me from looking through this book, and in particular with reference to the discussion of incubation, it is the same as the book that I owned prior to my own work in incubation.

In both the Davis 1911 incubator and the Muskogee 1912 incubator the eggs were turned by the method of rolling the eggs in the tray. This was usually accomplished by removing a few rows of eggs from one edge of the tray and transferring them to the other, and pushing the eggs over, causing them to roll or turn, which was the prevailing practice in the art of incubation at that time.

As to the opinion by Judge Westenhaver, in the United States District Court, in the case of Buckeye Incubator Company, et al. vs. Wolff, reported in 291 Federal Reporter, Page 253, where Judge Westenhaver, referring to an article that was introduced in evidence in that case, purporting to describe my incubator, used the following language: "One article says that 5,000 eggs in superimposed trays are placed in one chamber 2 by 4 by 4 feet, which is manifestly impracticable." The number of eggs stated to be in the compartment of the dimension of 2 by 4 by 4, was based upon the rated capacity of the Muskogee incubator, as being 250 eggs in twenty trays, which was the capacity as used in incubation if no chicks were being hatched in such compartment at the time. The actual number of eggs that can be placed in a tray depends upon the size of the [fol. 753] eggs and the tightness or arrangement with which they are packed. When large eggs are laid loose on their side and not closely packed by a definite arrangement, the tray does not hold as many. With smaller eggs carefully packed in, many more eggs can be placed in a given area. The rating of 250 is merely an arbitrary rating in round numbers, it is an underrating of the maximum number of eggs that might be placed in such a tray by more careful packing. As evidence that this is not an over-statement of egg capacity of such a tray, I would call attention to the fact that in an ordinary commercial egg case, the filler used is less than 1 foot in each direction, and the space contains 36 eggs, which when the pasteboard filler is removed, will turn on their sides and easily accommodate themselves in the egg case space. This use of an egg case shows that less than 1 square foot of area will maintain and allow for the 36 eggs. The 2 by 4 feet egg tray contains 8 square feet, hence on the egg case arrangement, would contain 8 times 36 eggs, which is 288 eggs. Therefore, the Judge is wrong in stating that such a chamber would not accommodate the eggs. It would accommodate that number readily, as shown, and as used in practice in the Muskogee incubator. The Davis machine used a higher tray, the wall of which was sufficient to accommodate the chicks at hatching time, and hence in a given space would not have provided for as many eggs.

Regarding Judge Westenhaver's statement in this same opinion, in reference to an article appearing in "Poultry

Culture": "Something is said about driving the air from top to bottom by a centrifugal fan, but the position and location of the fan with respect to the eggs and the direc- [fol. 754] tion of the drafts are not defined, much less is any provision disclosed for driving the air currents in a defined channel or for removing the foul air and supplying fresh air. All that can be said is that heated air is to be forced into a chamber filled with eggs, permitted to go where it pleases, and escape by some undescribed method of ventilation." The actual use in both the Davis and the Muskogee incubators involved the use of a fan which drove the air in a definite enclosed and complete circuit. The air currents in both incubators are directed to flow in definite channels including passage through the egg chambers, in both incubators, this passage being from the top of the chambers down through the trays of eggs to the bottom. The distinctions in the method of this air circuit in the two machines I have already called attention to, but they relate to the passage of air outside of the incubating chambers in relation to the fan and heater and passageways. The circuit of air flow through the chambers, through a heating chamber and through the fan, was the same in both incubators and was a definite closed circuit. The idea that the air was blown into the chamber and allowed to escape where it would, is incorrect. By far the major portion of such air flow was in both cases returned and recirculated through and by the fans. The exception to this is the necessary relatively small fraction of the air flow or exchange of air which in both incubators was provided for to allow of new oxygen and the escape of carbon dioxide gases.

On May 3, 1911, I filed application, Serial No. 624885, in the United States Patent Office and the photostatic copy [fol. 755] handed me is a copy of this application and shows my signature thereon. This application became abandoned.

Judge Westenhaver, in his opinion, referring to this application and the specifications thereof, says the following: "No provision is made for removing foul air, or supplying fresh air, or conserving moisture. No well defined channels for the circulation of air are provided." With regard to the actual incubator, both the Davis incubator and the Muskogee incubator, in regard to the provisions

made for the introduction of fresh air and the escape of foul air, I will say this: That the necessity of such exchange of air, for purposes of ventilation in incubation, was a well-known principle in the art. The embryos of chicks are living animals, and require oxygen, and breathe as do other animals, and as a matter of common knowledge and common sense, their life could not be maintained without suitable ventilation or oxygen supply. Therefore, as an experienced operator of incubators, I could not possibly have conceived or attempted to incubate in a chamber in which ventilation provision was not made. Ventilation provision was made, as I have previously described, in both the Davis and the Muskogee hatcheries. In regard to the second idea involved in the Judge's statement, which relates to the flow of air in directed channels: In both the Davis and the Muskogee incubators, this flow of air, by means of a forced draft, impelled by a fan was very definite, as I have described, being in a complete circuit through the fan, the heating chamber and the incubating chambers. In the case of Buckeye Incubator Company and Samuel B. Smith, plaintiffs v. Elden C. Cooley, defendant, [fol. 756] in the United States District Court for the District of New Jersey, Judge Bodine says the following: "Hastings never seems to have procured results. He built one sort of an incubator and the next year changed to another. The following year he built another kind of incubator and so on."

The statement regarding a change of method or construction of incubators, as illustrated by the Davis plant, as built and operated in the season of 1910 and 1911, the Muskogee plant built the following season, does not apply to any essential principle of incubation or the methods of air circulation by a fan in direct currents through the incubating chambers. Any change in construction of the incubator at Muskogee, as compared with the Davis incubator, was merely mechanical expediency because of the larger plant and the necessity of distributing the air flow over a larger number of incubating chambers, and there was no departure from the essential and distinctive principles of incubation by a forced draft which I had conceived as original ideas before building the first machine, and which were used and applied in a larger machine at Muskogee.

In this opinion, Judge Bodine also states: "Hastings undoubtedly had a greater measure of success but it seems probable that he never had, in combination with a fan, restricted openings for foul air, eggs in different layers in a closed chamber, and the currents of heated air so created as to diffuse and maintain the air throughout the egg chamber at substantially the same temperature, so that the units of heat were carried from the eggs in the more ad- [fol. 757] vanced stages of incubation to those in the less advanced stage."

The facts stated in that opinion would fully describe the construction and usage of both the Davis and the Muskogee machine, with the exception of the last clause which does not relate to the construction of the machine or the air-directed currents, but merely to the place that eggs would be placed in the chambers. The elements he stated do correctly state the elements of operation, except the last one to which I take exception. He correctly stated what I did have. He states that I never had them. I state that I did have them.

In the opinion of the Circuit Court of Appeals for the Third Circuit, in the case of Buckeye Incubator Company, et al. v. Cooley, reported in 17 Federal, Second Series, page 453, the opinion by Circuit Judge Woolley, Judge Woolley uses the following language with respect to the Davis incubator of 1911, the Hastings' application for a patent of 1911, and the Hastings Muskogee Hatchery in 1911 and 1912, and the Hastings Port O'Connor hatchery in 1912: "More important still, there was no arrangement for establishing and regulating currents of heated air, and similarly no provision for obtaining uniformity of temperature other than that initially provided by the heating means. Moreover, it should be noted that the heated air, like the wind; would go where it listeth and, accordingly, it acted as it pleased. The result was negative and, judging from what happened to the hatcheries, it was not successful."

The statement as applying to the Davis and Muskogee hatcheries, which I have described, that the air currents [fol. 758] were not definitely directed, and the "air going where it listeth" is incorrect, because in both of these plants, as described and illustrated by drawings I have discussed, the air current was a fan-driven current and in a complete circuit, returning to the fan. Therefore, it must

have been a definite and directed current, and was. The maintaining of uniformity of temperature in incubation can apply to two ideas: One is regulating the temperature, which is done by means of thermostatic control upon the gas flow as a source of heat, used in both the Davis and Muskogee incubators—an essential principle of incubation as recognized in the art. The further element that might be meant by the phrase, "Maintaining uniformity of temperature" would refer to a space distribution of temperature throughout various parts of the incubating chamber or chambers. In both the Davis and the Muskogee incubators, this maintaining of uniformity of temperature in space, and particularly in different vertical heights, was maintained by the forced draft of air from the fan. In both the Davis and the Muskogee incubators the air through the incubating chamber was driven by a fan and was an enclosed or complete circuit, returning to the fan, and, therefore, the air did not go where it listeth but where the fan impelled it.

Q. The Judge states that the results obtained was negative and that judging from what happened to the hatcheries it was not successful. What have you to say as to that?

Mr. Ely: I object to that. There has been a clear finding of fact by the courts as to what Hastings did.

[fol. 759] Mr. Greer: Which findings of fact we are undertaking to establish were erroneous.

The Judges' opinion that the results were negative seems to me to have no meaning, since both the incubators hatched successfully, the success of the hatches depending upon the quality of the eggs, as with other incubators. The conclusion that the Judge has derived, that the operation of the incubator was unsucessful, is evidently from the fact that I did not continue to operate the machines. I built the machine for Mr. Davis. He owned the machine. I operated it the first season employed by him to do so. There was not sufficient work there on his poultry farm to justify his retaining my services and, therefore, I left upon completion of that hatching season. In Muskogee, I built the machine for Mr. Lieber and was paid to do so and to operate it. The Muskogee machine engaged in custom-hatching. With my own youthful enthusiasm to do a big busi-

ness quickly, and Mr. Lieber's desire to promulgate the poultry industry, we offered to do custom-hatching at a very low rate. This was a commercial mistake which resulted in shewing no profits from the season's work, because the miscellaneous expenses of operation and labor were greater than anticipated, but the failure of the hatchery to return a profit was not based upon the failure of the incubator to hatch eggs.

I did not build either incubator to sell. I was employed to build and operate both incubators for the individuals for whom I built them, and they were operated for the [fol. 760] purposes that I have described, and not to sell these machines.

The report of the Master in Chancery in the United States District Court for the District of Oregon, in the case of the Buckeye Incubator Company and Samuel B. Smith, plaintiff v. Archie E. Stone, defendant, used the following language with respect to my incubators: "In the first device, according to the testimony of S. J. Ward, not over 5 per cent. of the fertile eggs hatched. By means of the latter device, 40 to 50 per cent. of the fertile eggs hatched, but the hatchery was not a success, and Hastings did not discover any means to overcome the defects which were inherent in the apparatus."

The statement made refers to one S. J. Ward. I do not remember knowing any man by the name of S. J. Ward. It also refers to this Mr. Ward giving an opinion about a first and second incubator, which I presume refers to the Davis and the Muskogee machines. If so, there is an error, because I am positive that no Mr. S. J. Ward or any other person saw both machines in operation or was familiar with them. I know and would remember all of those who saw the Davis machine, as there were only a few in number and were personal friends of Mr. Davis and myself. In Oklahoma we were doing custom-hatching and had a large number of patrons, a large number of visitors, and I obviously would not remember a very small percentage of people that would have seen that incubator. Mr. Ward might have been among those, I don't know.

The statement as to not over 5 per cent. of fertile eggs hatching in the first machine is erroneous. The concluding [fol. 761] part of the statement that "Hastings did not discover any means to overcome the defects which were in-

herent in the apparatus", I don't know what defects he refers to. Both machines hatched successfully.

The Master's report continues: "In fact, Hastings asked Mr. Ward, 'Why don't this thing hatch', to which the witness answered, 'Milo, I don't know unless it is the acid or effect of the paper that you are using to line it'."

I have no memory of making such a statement and do not believe that I would have made such a statement. Neither do I know, in either plant, what could have been meant by the paper which I used to line it. The Davis plant was lined with insulating cork, and the Muskogee plant was matched white-washed lumber. I might have made a statement to some disgruntled customer whose eggs did not hatch: "Why don't these eggs hatch", but I would not have made a statement "Why don't this machine hatch", because at all times of the season we were getting successful hatches from good eggs in the Muskogee plant —also in the Davis plant.

The general plan of operation in the Davis machine was to place the eggs, when first put in the incubator, in the upper tray levels, and to move them down in order to have the hatching occur in the lower trays. This method of operation had no significance in my mind in regard to the successful incubation of the eggs, but was merely a matter of expediency, because open-mesh trays were used, and chicks at hatching time give off a good deal of litter and befouling matter, which it is not desirable to have dropping down on other eggs. In the Muskogee plant the same general [fol. 762] method of placing the eggs, when first brought to the machine, in the higher levels and hatching the chicks off in trays placed at the bottoms of the compartments, was user, but in the Muskogee machine, because of the much larger capacity with which it was operated and the larger number of trays, it was found that if a large number of trays of eggs in the later stages of incubation, when they give off considerable animal heat, were left placed in juxtaposition, that they were inclined to overheat, due to the interradiation of heat from these eggs to others adjacent. Therefore, we used the method of introducing trays of newer or younger eggs, as we call them, in between the trays of older eggs, to reduce this heating tendency and to equalize the temperature of the eggs at different stages of incubation, but using the method of hatching the chicks out in the bottom trays as in the previous machine.

The difference I have spoken of was that of inter-spacing eggs of different ages in the Muskogee machine, merely because of the larger number of eggs and the greater crowding of capacity of the machine. There is no absolute fixed practice. The eggs would incubate in any convenient place in the machine, because of the heating tendency of a large number of trays of advanced eggs when placed together.

As to my abandoned application 624,885, I made one appeal on the application and was told by my attorneys—that is one appeal from the first examiner—I believe a Board of Examiners—and was told by my attorneys at the time that the application had been rejected, and at that time which was after the operation of both of the incubators that I [fol. 763] have described, I was in financial hard straits, and discouraged with my work, and lacked funds to take an appeal to the Higher Court, and therefore assumed that patent claims having been rejected, it was not considered allowable, and did not prosecute it before a higher appeal.

The album, offered for identification as Defendants' Exhibit 26, is delivered to counsel for the plaintiff for inspection during the adjournment, until Thursday morning, to be redelivered at the adjourned session.

Recess taken to 9.30 A. M. Thursday morning, November 9, 1933.

Deposition of Mr. Milo Hasting was continued pursuant to adjournment, at 9.30 A. M. Thursday, November 9, 1933.

Further direct examination.

By Mr. Greer:

Over objection by plaintiff as calling for hearsay evidence, the witness testified:

After I left the Davis poultry farm in Brooklyn, New York, at the conclusion of the 1911 hatching season, Mr. Davis continued to reside at that place, and as I understood from later information from him, he conducted some further poultry operations there for a comparatively brief time, but Mr. Davis was a man with many and versatile interests, and in addition to his regular business as a linotype business, he became interested, the season after I left,

[fol. 764] in aviation, and purchased a Wright plane, and I understood from him that he became involved financially with his aviation interests so that he lost heavily, and perhaps within the next year or two lost control of his business and gave up his Brooklyn residence and closed out his poultry work at that point.

The incubator which I built and installed at the Davis poultry farm, was not capable of being removed without tearing it down or destroying it. The incubator was built in a room in a basement or residence, the only door into the room being an ordinary sized door. The incubator was built in place and attached to the ceiling. The insulation of the top of the incubating chamber was nailed directly to the ceiling beams of the basement of the residence. It would be utterly impossible to have removed the incubator from the building without completely demolishing it.

I operated the Muskogee incubator during the active hatching season of 1912. I left there in the month of May. We still had a few eggs in the machine, but we were taking on no new business, and my assistant was employed by Mr. Lieber to continue to run those eggs out. I left Muskogee, having no further employment there, and the hatching season was over, and I had made no arrangements for other employment and I went from Muskogee to Petaluma, California, the well-known poultry center, with a view of interesting others in the construction of similar hatcheries, with which I was unsuccessful.

With reference to this Muskogee 1912 incubator, the Sirocco blower installed in it was a standard 8 inch blower—[fol. 765] 8 inch outlet. I would not be able to testify exactly as to the revolutions per minute at which it was run, but I would have operated it at the recommended speed, which for a blower of that size would be from 600 to 800 revolutions per minute.

Defendants' Counsel then offered in evidence as Defendants' Exhibit 27, a book published in London, England, in 1750, entitled "The Art of Hatching and Bringing up Domestick Fowls of all kinds at any time of the year" by M. de Reaumur of the Royal Academy of Sciences at Paris, with particular reference to the following pages: Pages 1; 2 (lines 1 to 13); 3 (lines 5 to end); 4; 5 (lines 1 and lines 17 to 27); 6 (last paragraph); 7 (lines 1 to 2); 9 (lines 3 to 18);

13 (lines 16 to 22 and last paragraph); 14 (lines 5 to 17); 15 (all except last seven lines); 16 (lines 18 to 22); 17 (lines 8 to 26); 18 (lines 19 to 22); 19 (lines 21 to 35); 20 (lines 5 to 16); 22 (lines 4 to 6 and from line 11 to end); 23 (lines 1 to 5 and 9 to 21); 35 (last paragraph); 36 (first six lines); 47 (first full paragraph and plate opposite page 47, marked "Plate 1"); page 47 (first full paragraph); 48 (line 12 to end and also opposite plate marked "Plate 2"); 49; 50, and the opposite plate marked "Plate 3"; 51 and the opposite plate marked "Plate 4"; 52, 53; 54, and the plate marked "Plate 5"; 61 (lines 7 to 18); 71 (lines 12 to 17); 116 (lines 16 to 23); 122 (lines 12 to 24); 130 (lines 10 to 29); 146 (line 29 to end); 147, and the opposite plate marked "Plate 7"; 148; 149; 152 (last paragraph); 153 (lines 1 to 24); 154 (lines 13 to 18); 157 (lines 4 to 21); 158 (lines 20 to 27); 184 (last paragraph); 185 (lines 1 to 12); 187 (lines 10 to [fol. 766] 25); 190 (last five lines); 212 (lines 23 to end, and also opposite plate marked "Plate 8"); 213; 214; and 215.

Cross-examination.

By Mr. A. L. Ely:

I was born in 1884. In addition to the publications which were offered in evidence on behalf of the defendants yesterday, I composed and published a pamphlet called "A Million Egg Incubator", portions of which are reproduced in the record in the Cooley case at pages 251 to 256, being Defendants' Exhibit D-C. That is a reproduction from a pamphlet, which was spoken of in my testimony yesterday. I furnished the material, or much of the material, for the article in the "Poultry Culture", published in February, 1912, a reproduction of which was Defendants' Exhibit D-F in the Cooley record. I supplied information on which this article is based. I supplied the photographs to the publisher.

As to the article in the Boston Sunday Globe of November 10, 1912, which is Defendants' Exhibit D-G in the Cooley record, I did not know the writer of this article. The photograph of myself, and the one view showing my plant which I built in Muskogee, were supplied by me, and the information in the article was probably supplied by me in correspondence, my memory being that this article was written by a man in St. Louis, and first appeared in the Globe-

Democrat of that City, from which it was obviously syndicated, or also sold to the Boston Globe.

I find the article contains information quoted from me. The article contains direct quotations credited to me. They were probably either from other writings published or from [fol. 767] correspondence with the writer of the article. I remember corresponding with a writer in St. Louis, and that is all the memory I have of that article—a newspaper man in St. Louis.

The article in the "Technical World" of April, 1913, which is Defendants' Exhibit D-I in Cooley record, page 302, is signed by George F. Paul, and contains two photographs which I undoubtedly furnished. I had a fairly large correspondence at that time with people interested in incubation and poultry work, and I have no direct memory of furnishing this particular information, but I have reason to believe that I did, by correspondence or from previous publications—clippings.

I wrote an article in the "Country Gentleman". It appeared August 10, 1918, called "Coming—the Roosterless Farm" which is Defendants' Exhibit D-L in the Cooley record, pages 305 and 306.

As to the other articles which were referred to by the defendants yesterday, the article in the "Electrical World", "Popular Mechanics" and "Popular Electricity Magazine", I did not write any of those articles, and it is my impression, I think, of all the three articles—at least some of those were either written or furnished to other writers by Mr. Hickox, whose scrapbook came into evidence yesterday. I am not positive of the authorship of those articles.

The booklet entitled "The Dollar Hen" was written by me before any attempt had been made to construct the mammoth incubator, according to my ideas. It was in the nature of an imaginary incubator, rather than an account of an actual incubator that was in existence at that time. [fol. 768] As to whether I got the basis for my ideas on incubation from one Madison Cooper, a refrigerating and ventilating engineer, my study of the art of refrigeration, in connection with my employment in the United States Department of Agriculture, led me into a knowledge of Mr. Cooper's method of using a fan circulation of air for the purposes of equalizing temperature in refrigeration. I

adapted that idea to incubation. I did not get the idea of applying the method of incubation from Mr. Cooper—that was my idea, to which I give Mr. Cooper's work in refrigeration the credit of stimulating the thought of the application to incubation. I had not seen any of Mr. Cooper's refrigeration apparatus. I had read an account of Mr. Cooper's method, and I also visited Mr. Cooper, with a view of interesting him as an engineer, in working with him on making this adaptation to incubation. That was before I wrote the book entitled "The Dollar Hen". I think I was still in the Department of Agriculture. I think that was late in the year 1908 when I visited Mr. Cooper.

I believe Mr. Cooper's refrigerating apparatus consisted, generally, of a room with a perforated diaphragm above and below the room, through which the air was circulated, a diaphragm both above and below, with small openings —numerous small openings—leading into the room. That is my memory of drawings in Mr. Cooper's articles or book —I believe it was a book.

It occurred to me, while considering this method of refrigeration, that the problems of refrigeration and the [fol. 769] problems of incubation were very similar, in fact we might say identical, and I believe I so wrote in "The Dollar Hen" I did so testify in the Cooley case.

As to whether Judge Westenhaver was correct in the Wolff case, when he said that "The Dollar Hen" article "merely describes a process for maintaining temperature in cold storage and suggests how it may be applied in a hatchery", he is correct in that being the essence of germination of my idea of describing and equalizing the stratification of temperature in a room by means of a forced draft from a fan. He is correct when he says the article "Merely describes a process for maintaining temperature in cold storage and suggests how it may be applied in a hatchery". He is correct when he says in the same opinion "It does not purport to describe an apparatus or ever to have been put to any use".

Q. And substantially the same thing is said in the Boston Sunday Globe of November 10, 1912, where it says: "The application of these same principles of engineering to incubation seems so easy that Mr. Hastings supposed others would have no trouble in seeing the thing as he did". That is a correct statement, isn't it, in the Boston Sunday Globe article?

A. That is the conclusion drawn by the writer. He may have derived that from correspondence with me or from reading "The Dollar Hen", I do not know.

Q. Isn't that a correct statement of the situation—the quotation that I have made?

A. The statement of my opinion, as expressed in "The Dollar Hen", was that the adaptation of the forced draft fan system of eqnalizing temperature, used by Cooper in [fol. 770] cold storage, would apply to incubation. I was under the impression that the application of the device and method to incubation constituted an invention. When I applied for a patent, I had cited, as reasons for the patent not being granted—was that there was no invention involved in such an adaptation, which is one of the reasons that I abandoned that patent.

Q. Just a minute—you are not answering my question. What I am asking is whether this statement emanated from you: "The application of these principles of engineering to incubation seems so easy that Mr. Hastings supposed others would have no trouble in seeing the thing as he did"—did not that statement originate from you?

A. It is not a direct quotation, and I have no memory of writing that exact statement, but my statements in "The Dollar Hen", with the testimony that I just gave, do substantiate that general conclusion. That general conclusion is correct.

Defendants' Exhibits 21 and 22 and 22-A were made by a draftsman employed by the attorneys for the defense, from information supplied by me, and the drawings were slightly corrected after being shown to me. These drawings were made in the office of Toulmin & Toulmin, so far as I know. I don't know when. I did not make them. I first saw these drawings about a week ago. They were mailed to me. I was not present when these drawings were made. They were made from information supplied by me, also using drawings in the Cooley case record, which has been referred to.

The basis of the drawing of the Davis hatchery was the [fol. 771] drawing which was introduced in the Cooley record as Defendants' Exhibit D-D. Slight changes have been made. The drawings made in the Cooley record were made in similar fashion, and were not shown to me and given the opportunity to make any alterations or corrections, as

the drawings in this case were, so any slight differences in those two sets of drawings are due to my correction of the latter drawings, having had opportunity to correct them. I testified in the Cooley case from this drawing, Defendants' Exhibit D-D. I testified that that drawing (Defendants' Exhibit D-D) was a correct diagrammatic drawing, showing the principles of operation of the Davis hatchery.

The same statement I just made in regard to the Davis drawing applies to the drawings of the Muskogee hatchery, which were Defendants' Exhibits D-J in the Cooley record. The essential principles of air circulation are correctly shown in both drawings. I testified that the drawing in Defendants' Exhibit D-J in the Cooley case correctly showed the Muskogee hatchery as a diagrammatic drawing showing the essential principles of operation. I testified in the Cooley case that the drawing was correct, qualified by the phrase that I gave—a diagrammatic drawing showing the principles of operation. They were correct drawings of the Muskogee hatchery, with my qualifying phrase.

I did not make any corrections of the drawings of the Muskogee hatchery when I was on the stand in the Cooley case. I appeared in person and testified before Judge Bodine in the Cooley case. As to testifying for several days, both with regard to the prior uses claimed, and also as an [fol. 772] expert, I don't remember how long I testified, but you have the record.

Taking Defendants' Exhibit 21, which is the drawing of the Davis hatchery prepared by Toulmin and Toulmin, and as to the space that has been marked with a question mark, shown in the partition between the chambers "G" and "E", at the top of the partition between the chambers "G" and "E". There is nothing represented there except the opening or outlet from the fan into this chamber. The long narrow opening which is marked with the question marks has no significance, as I understand. I don't know why it is there. The arrow shows the entrance of the air from the fan. There was no opening across that partition as is shown in the drawing, except from the fan. As shown in the Cooley case drawings, there appears to be a long opening, and the fan appears merely to be driving the air through this opening, but the fan is not shown as set in the wall—ceiling or wall—against a return flow of air into that chamber, which is an error that has been corrected in the drawings now offered in this case. That is to say, the

drawing of the Davis hatchery in the Cooley record shows a fan discharging upwardly into the fan chamber, in the general direction of the opening, whereas in the drawing that was submitted yesterday and prepared in Toulmin & Toulmin's office, the fan is shown with a long outlet which discharges directly into the chamber through that opening. I don't know whether I called attention in the record in the Cooley case, when testifying, to the erroneous showing of the fan. I don't remember. That change has been made by me from recollection. I had no drawing or anything [fol. 773] of that kind on which I based my showing of the Davis hatchery, either in the Cooley case or in this case. It was purely from recollection. The drawing in the Cooley case was made just shortly before the trial in the Cooley case. The drawing in this case was made just shortly before this hearing.

I had nothing whatever on which to base the drawings or my instructions to the draftsman except my recollection, reenforced by the knowledge that the air circuit was a closed circuit, and that an opening, which the draftsman in the Cooley case drawing left there, would have made the incubator inoperative by the principle upon which I was operating, which is a closed circuit of air through the chambers.

Q. What I am asking is: Whether you had, when either of these drawings were prepared, any memorandum or drawings or anything that was contemporaneous with the Davis hatchery, on which you based the drawings—did you have any such thing as that?

A. I had no drawings, I had my memory reinforced by my published statements of the principle and method of operation of the air in a forced draft enclosed circuit, as I have described it in this testimony.

Q. Then your testimony is that these drawings are made entirely from your recollection?

A. That is correct.

Regarding this long opening in both the Cooley record and the present Exhibit 21, I noticed it being there in the Cooley case record, and called the attention of the attorney in that record to the inaccuracy of the drawing, but his statement was that the drawing was diagrammatic and merely for the basis of testimony, and that the drawing [fol. 774] did not purport to show accuracy in all details

but only accuracy in the principle of the circulation, and were working drawings from which I could illustrate my testimony in describing the method of operation of the machine.

As to the opening in the partition between the chambers "G" and "E" extending substantially the width of the chamber, there are lines here that quite obviously were taken by the draftsman from the Cooley case drawings, but the opening from the fan in the drawings submitted in this case is very clearly marked off from the other lines, and the arrows indicate that the air flow comes exclusively from the fan.

Q. I am not talking about the discharge opening from the fan. I am talking about that opening clear across the partition?

A. What do you want to know about it?

Q. What I want to know is whether you called the attention of Toulmin & Toulmin to the fact that——

A. I did not, I overlooked it.

The witness resumed: I noticed that the fan was correctly shown as having an otherwise sealed passageway into this partition so that the fan draws the air into the partition, the arrows of which show this air flow. I did not observe these lines in this drawing as having any meaning. The same thing is not true in the Cooley record. In the Cooley record it is quite obvious that the fan, as shown, is not having its outlet set into the partition, it is set behind the partition, only driving the air towards it.

The same opening appears in the partition between the chambers "G" and "E" in the Cooley record.

Q. And you testified with regard to these drawings in [fol. 775] the Cooley record, and didn't call the Court's attention, in the Cooley case, to the fact that that was a mistake?

A. I do not remember.

Q. You didn't call Toulmin & Toulmin's attention to the fact that that was a mistake?

A. I did not observe it on the Toulmin drawings.

Q. As a matter of fact, was there such an opening in the partition?

A. There was not.

Q. And that is wrong?

A. That detailed drawing is wrong.

Q. And this discharge opening for the fan was made in the drawings which were just prepared within the last two weeks.

A. It was.

Q. And the drawing which you prepared in 1928 showed the other arrangement?

A. It did. The testimony in the Cooley record—testified correctly it was air flow.

Q. Did you not testify in the Cooley case, in answer to cross question 83, page 107, in answer to the question: "Q. When did you, in fact, reproduce or make these drawings? A. Within the last two—or three or four months."

A. Yes.

Q. Then you did prepare the drawings in the Cooley case—you so testified in the Cooley case. Do you want to look at your testimony?

A. (Referring to same.) I testified that I reproduced these drawings from photographs, my memory, and some slight points recalled by talking to Mr. Walter B. Davis, the man for whom it was built. By that testimony I meant that I supplied the information to a draftsman who made the drawings, not that I wielded the pen.

Q. You state then that your testimony at this point in the Cooley record is in error. Do you deny that you, in fact, reproduced those drawings in the Cooley case, when you testified that you did, in that case?

[fol. 776] A. I did not intend to indicate the meaning that I was the draftsman, but that I was the man responsible for giving the information from which the draftsman made the drawings.

Q. Then, you gave the information for the Cooley drawings, is that correct?

A. I did.

This Davis hatchery was built in the winter season of 1910 and 1911. It was completed probably in midwinter—February or early March, 1911. I don't remember the exact date. I operated it personally through the active season until Mr. Davis had as many chicks as he could handle. I left Brooklyn at the end of that hatching season, probably May, I don't remember the exact date. I don't

know whether I left the last of April or the first of May. I do not know the day I left. I do not deny that I left about the first of May. I cannot give any better information on that. I believe the hatching season was still going on when I left. I think Mr. Davis' man Miller operated the machine at that time.

Q. The fact of the matter is you know you left while the hatching season was still on—while they were still hatching there in Brooklyn, isn't that true?

A. No, I have no detailed memory of when I left. I know where I went to reside when I left, it was here in New York City, and I quite possibly continued to go out to Mr. Davis' plant, as I did, for some time when working with Davis. I began working with Davis the previous fall, when I resided in Manhattan Island, going out there for work, and later during the active working season of constructing and operating this incubator, I resided in Mr. Davis' residence.

My impression is that the incubator was still in operation by Mr. Davis and his employee Mr. Miller at the time I left [fol. 777] his residence. Mr. Davis allowed me a small compensation to help me live while I was working, but I was also a writer and had other employment at the time. I wasn't exclusively employed by Mr. Davis.

Q. Didn't you leave Mr. Davis' employ, and didn't you leave this hatchery before the hatching season was over?

A. My memory on that is that his man Miller whom I instructed in the operation of this incubator and who was in charge of his chickens, continued to operate that incubator after I left, yes, therefore, in that sense I left before his hatching season was over.

Q. You didn't see the thing through this one hatching season then?

A. In the sense that I stayed at the residence there in the constant employ of Mr. Davis through the entire hatching season, no.

Q. That is, you didn't see it through the whole hatching season, that is, you didn't stay with it during the whole hatching season of 1911?

A. No.

Q. And you don't know personally whether it was continued to be used during that season, do you?

A. Yes, I know Miller operated that incubator after I left, because I remember discussing that matter with Davis.

Q. That is all a matter of hearsay only, you remember what somebody told you.

A. I don't remember any more details than I have given you on that.

In this Davis hatchery there were forty trays, ten layers high, four trays to a layer. We rated the egg capacity of each tray as 150. I think that was probably overcrowding a little, because my memory of those trays is that they were [fol. 778] approximately 2 by 2 feet, which was just about half the size of the Muskogee trays which were rated at 250. Therefore, the capacity of those trays would have been 125 minimum, 150 maximum. I did not intend to give the impression by my testimony yesterday that this Davis hatchery was run any time completely filled with eggs. I testified in the Cooley case that the maximum number of the eggs in the hatchery at that time was about 2,000, and that is correct. The hatchery was built for 6,000 eggs, but there was no need to operate it at that because we were not engaged in the hatching business, but only running a private poultry farm. At no time while I was there was the hatchery run to capacity. It was never run more than one-third capacity. I do not know how it would have operated had we filled it full. When we operated that hatchery we set the eggs about twice a week. I do not recall, in the Cooley case, I testified we set once a week. I do not remember whether we only set once a week.

When we set at any one time, we would plan to fill four trays in a single layer at once to equalize the resistance for the air flow in the four vertical tiers of trays, by having the same depth of eggs in each part of that compartment. It did not have means to shut off any part of the vertical tiers as did the Muskogee machine, hence it would be essential to good practice to fill the layer clear across to equalize the air resistance.

Q. Did you not testify in the Cooley case, on page 109, in answer to cross question 91: "My memory is that we had about at least three horizontal layers in there, hatching [fol. 779] at one time, we got eggs in about three stages, putting them in once a week, is my memory." Did you not so testify in the Cooley case?

A. I did.

Q. Then, your testimony on the stand in the Cooley case is at variance with your testimony given this morning, and you really only set, in the Davis hatchery, once a week?

A. I cannot be positive on either statement for this reason: The hatchery of this type permits you to set eggs when you please, at any time. When you put them in is a matter of when you get the eggs, and the matter of convenience of the size of lots run. Mr. Davis had eggs supplied by his own fowls. He also purchased eggs. The statement that I set once a week, which appears in the Cooley testimony, is probably my memory then, perhaps refreshed by discussions with Mr. Davis of the frequency at which he purchased eggs. He might have set his own eggs more frequently. I do not remember the details of the time we set these eggs, because it was of no importance to the principle of incubation but merely a matter of convenience in handling the eggs and taking off chicks. I have no memory today, after some twenty-two years, on which to base a positive statement as to the exact time of setting these eggs. Therefore, I am not willing to say that I testified falsely then or that I testify falsely now. I am giving the best memory I have today. I do not say that my testimony in the Cooley case was wrong.

Q. Do you remember on page 111 of the Cooley record: "I can remember we placed eggs in once a week. I cannot remember the exact number of hatchings."?

A. I don't remember. You have it there written, I am willing to accept it that I testified.

[fol. 780] In this Davis hatchery, when we made one setting of eggs, we set one layer of eggs in a horizontal layer of four trays. We might not always have done so. I remember using paper in the empty trays to block off air passage through them in case the eggs were too few in number to spread over the machine. I do not think we operated the Davis incubator with less than one full layer of trays across the machine. We were interested in the equalizing of the temperature of the various layers of eggs and not having full capacity to test that principle, we would have blocked off a portion of that area, using less of the cross-sectional area and a greater number of trays in depth, which would have been the purpose of that method which I just referred to.

We purchased eggs from the place from which Mr. Davis was buying eggs in case lots, 360 eggs, which would have approximately filled the four trays. That is the reason I testified that we were in the habit of putting in the four trays at once. That was our egg supply, but we had additional eggs from his fowls which might have been put in more frequently than smaller lots. I think that is where the confusion of memory occurs in this matter. I don't remember any further details than I have given you.

If we set one complete layer of trays across the machine one week, then the next week we set another layer of trays across, and the next week we set another, we would never have had more than three horizontal layers full, if that is all the eggs we set. That is not all we ever set. We never set more than 2000 eggs, but that is less than 2000 eggs. [fol. 781] If we set as testified in the Cooley case a layer of trays across the machine once a week, we would never have had, at any time, in that machine, 2000 eggs. The testimony regarding the practice of setting eggs once a week refers to the eggs we purchased in a case, which were shipped once a week, but it does not refer to the full use of the machine, because as I have said, we also incubated eggs from Mr. Davis' own flock in addition to those purchased.

Q. What you testified in the Cooley record—you only set the eggs once a week and you want to change the testimony you gave in the Cooley case?

A. To that extent, yes.

Q. Then you weren't testifying correctly when you testified in the Cooley case five years ago?

A. The testimony in the Cooley case five years ago is inconsistent with itself, when those two statements are contrasted, because I testified in the Cooley case that the maximum amount of eggs was about 2000 eggs a week.

Q. That is to say, you are changing your testimony that you gave in the Cooley case for the benefit of this defendant?

A. I am calling your attention to the fact that the difference which you are now trying to establish appeared in my testimony in the Cooley case.

Q. Now, Mr. Hastings, how many times did you have the maximum number of eggs which you had in the incubator, which you say you had—how many times did you have that?

A. Unless a man counts his eggs and puts in exactly the same number, he only has a maximum once.

The depth of each tray in the Davis incubator was about 4 inches. The space between the top of one tray and the bottom of the next higher tray was sufficient to allow for [fol. 782] the slide in the chamber, on which the tray slid, a sufficient clearance. It would have been an inch or thereabouts. You use a ¾ inch slide ordinarily, and you would have to allow for clearance. I should think an inch would be very close to that distance.

While we were running this hatchery at the Davis plant, we were also running the Cyphers incubators, for comparative test purposes with my machine only, otherwise not. Mr. Davis owned four Cyphers incubators. He did not run them during the period that we ran mine. He did not run all those incubators full capacity during the season. He ran them for purposes of comparison with my machine. He did not run them full capacity for the purpose of using the sources of incubation, except for comparative purposes. I do not remember the exact number of hatches he might have used from this machine. I do not remember the exact number of eggs incubated in the Cyphers machines nor the length of time they were run.

I don't remember the date when I started to run this incubator shown in Defendants' Exhibit 21. I wouldn't be positive whether it was in March or April. It was earlier than April, I would be positive there. It was in March or February. It might have gone back to February, possibly, I don't remember. This incubator which is shown in Defendants' Exhibit 21 is the only incubator which I built at the Davis place.

As to whether I ever at any time enclosed the egg chamber in pieces of burlap or fabric above and below, my memory is that of trying panels of fabric for the purpose of [fol. 783] equalising the distribution of the air throughout the cross-sectional area. Whether I used those panels of fabric above and below the egg chamber, I think I provided for those and tried them out and found they were not necessary and discontinued them. That is my memory of it. It is not very accurate. When I used those panels of fabric above and below the egg chamber, the fan was outside of the panels. The fan was supposed to drive the air through those fabric panels. I did that early in the season; at the

beginning of the operations. Those fabric panels had the effect of checking the air flow and served no useful purpose. They were deleterious to incubation only to the extent of checking the amount of air flow; making the fan less efficient. I do not remember whether I tried to hatch eggs with the fabric enclosure above and below the chamber. I would know as to the effectiveness of the air circulation by other means than waiting for a hatch. The problem was that of maintaining the best vertical equalization of temperature and the effect of the fabrics was judged by the effect of temperature distribution and that was sufficient to judge as to whether they were advisable or not. I do not remember whether we used the fabric panels through a complete hatch or not. My memory of the use of the fabrics there was that it was of a nature of seeing the effect upon the equalization of temperature throughout the incubating chamber. That was the essential point of the trial of such fabrics and was the essential point as to whether they would be used or not. I determined this by actual use of the fabric. The expediency, in my mind, of the idea of using fabrics was a combination of the idea of diffused air, [fol. 784] which was made a great point of in the Cyphers machines of that day, plus the idea of the distribution of the air equally throughout the area of the egg chamber. It was a trial device to be tried out in connection with the distribution and flow of air, and it was found to be of no practical consequence, whether they were used or not, except as it increased the resistance in the air stream, and hence tended to check the flow of volume of air or the forced draft. I found this out by an actual trial.

Q. Did you find it out in actual trial to attempt to hatch eggs?

A. As judged by hatching effects I would say not. As judged by operating the incubator——

Q. I am not talking about operating the incubator empty, I am talking about hatching eggs. Did you try it out while the incubator was actually in operation hatching eggs?

A. Probably, yes. My memory does not supply me with positive memory on that question.

Q. Then you did try it out with the panels and found it wouldn't work?

A. I found that it checked the flow of air.

Q. Pardon me, will you answer my question?

A. No, sir, I will not, because you say it wouldn't work. What do you mean by "wouldn't work"?

Q. Hatch eggs.

A. No, sir, I never spoiled a batch of eggs in that incubator.

I did at one time have the incubator operating with eggs in it and the fabric panels top and bottom.

Q. Then you did have an incubator other than that shown in Defendants' Exhibit 21, at the Davis plant?

A. I don't consider that the insertion of the fabric panels [fol. 785] makes it a different incubator, and as we operated the incubator without the panels, the drawings are correct in that respect. The drawing does not show the fabric panels which I used at the Davis hatchery because that was a trial effort or idea in the first construction of the machine and was dropped from the usage, and the drawings show the machine as used after it had been tried out and found that the fabric panels were not necessary. That was not another incubator. If I carried a bucket of water and set it in the moisture chamber it doesn't make it another incubator. The presence of the fabric panels would affect quite materially the flow of air.

Q. Therefore, you had another incubator at the Davis plant in which the flow of air was different than shown in Defendants' Exhibit 21?

A. The change of rate of flow of air does not make another incubator.

Q. Will you answer my question?

A. I did not have another incubator.

Q. You operated an incubator, however, at the Davis plant, which is not the incubator shown in Defendants' Exhibit 21?

A. I did not, I refuse to accept that definition that that makes it another incubator.

Q. And that incubator with the fabric panels was the thing that you worked on first at the Davis plant, wasn't it?

A. The incubator shown was used or tried or operated with fabric panels at the beginning of the season. At the beginning of that operation I was experimenting. Any man who builds an original device of any sort and puts it into use is experimenting. If he finds that that device gives [fol. 786] service and uses it at that time he is not experimenting but using it. The whole operations were not ex-

periments. In some of my later articles, in referring to the operation I might have used that term "experiment" because I consider a man working out his experiment. I consider you cannot build and operate a new device without experimenting. The first trial is an experiment. If you make alterations in the article, some mere detail, those might be defined as experiments. We got an incubator which we operated for a length of time which was the same. It takes three weeks to hatch eggs, and after trying fabric panels or any other device and making alterations, and we then hatched a batch of eggs and find they hatch and repeat the experiment, that repetition without change is not experimenting. I do not know whether we ran a batch of eggs with the fabric panels. I don't remember whether we completed the hatch with fabric panels. You are trying to bind me down to the definition of experiment as used by a scientist as against the legal meaning. Asked whether the use at the Davis plant was kept secret, the witness said: This use at the Davis hatchery was in the residence of Mr. Davis, in the cellar. He was hatching for himself alone, or I was hatching for him, his employee, and it was not public in the sense that we had public customers nor any bid made to the outside public to come and visit the hatchery, but Mr. Davis's friends and mine were shown the hatchery.

Q. And you kept it secret because of the fact that you hadn't filed a patent application at that time, isn't that correct?

A. I think that was my impression at that time, of not wanting the general public in, yes.

[fol. 787] When I filed my patent application in May, 1911, I showed the incubator with the egg chamber enclosed by fabric panels above and below. My memory concerning just when these fabric panels were in or out of that machine, is not sufficient to answer details as to time or as to completeness of one or more hatches. The principle involved of distributing the air over a horizontal area by some means to spread it, was in my mind, and hence was put in the patent application, and was used, in a modified form but for the same purpose, in the Muskogee machine, with a series of compartments with the sliding doors above to regulate the flow of air into these different compartments,

and it was thought of speading the air over the area, that I was illustrating in the patent drawing. The patent drawing, which is reproduced at page 295 of the Cooley record, shows dotted lines which might be interpreted as fabric or as holes like the Madison Cooper platforms.

Q. Were those not described in the specification of the patent as "EE fabrics or perforated partitions for the purpose of causing an even horizontal distribution of air throughout the hatching chamber"?

A. Thanks for substantiating, from the patent specification, the statement I have just made from memory.

That is a correct description of the panels in the patent application. There are no such panels apparent in the drawing of the Davis hatchery which I have introduced as Defendants' Exhibit 21. I filed this patent application May 3, 1911.

I did not operate the Davis hatchery with perforated panels above and below, as distinct from the fabrics referred to. That would refer to a solid area with definite [fol. 788] holes like auger holes through wood. I used no such device in the Davis plant. This application for patent was prepared while the incubator was in operation.

This pamphlet entitled "A Million Egg Incubator" was prepared for promotion purposes; trying to interest people in the particular region in Kansas and Oklahoma, with the building of hatcheries or establishing poultry operations based on artificial hatching. I prepared this pamphlet with the idea of getting someone to invest in an incubator built in accordance with my ideas and to spend money on it. I did not circulate this throughout Kansas and Oklahoma. That is too wide a statement. I have no memory of the exact places I might have handed out or mailed this pamphlet. I prepared it with a view of using it, as just stated, and I remember making an effort to interest people in such a hatchery at Topeka, Kansas, Independence, Kansas, and Muskogee, Oklahoma, the last point at which I was successful. I used this pamphlet for the purpose of furthering that scheme with the idea of getting myself funds to build an incubator. In that pamphlet I said: "In the season 1910-1911 I built and operated a 15,000 egg single compartment hatchery in the poultry plant of W. B. Davis in a suburb of Brooklyn". I will take the responsibility for that

mis-statement. That was a mis-statement made for the purpose of promotion. I exaggerated the capacity more than two and a half times for the purpose of getting people to put money in it. As a matter of fact I hadn't run my incubator with more than 2000 eggs in it at the time I made [fol. 789] this statement. I went to Kansas in the late summer of 1911.

As to whether a corporation was formed when I connected with Mr. Lieber at Muskogee, to operate this plant, I have no specific memory on that point. Mr. Lieber was a lawyer and he might have planned or might have formed a corporation. I do not remember. I won't deny a corporation was formed, or that I perhaps owned 49 per cent of the stock of a corporation. Mr. Lieber, being a lawer as I said, would have probably protected his interest by forming a corporation. I don't remember whether I owned 49 per cent of the stock of a corporation. I will not deny I did. My memory is vague on whether I was an officer of a corporation. Mr. Lieber, being a lawyer, probably made some such arrangement. There was no formal functioning of a corporation, as I recall. He may have drawn up the papers and made that arrangement. He paid me a small salary and employed me to work while building this hatchery, and that was my memory of my practical arrangement with him, and the arrangements made for further developments I would have left with him, and what those were I haven't had occasion to recall, and my memory is hazy on that point.

My memory coming back today, I would say that I probably did own 49 per cent of the stock of a corporation which was formed by Mr. Lieber. I am not at all positive. Undoubtedly, if it is on record I did, but I hadn't thought of it for years, and I don't know. If you have a record to the effect that I owned a 49 per cent interest in the outcome [fol. 790] of the project, then I did. I don't deny it. I do not remember that I did.

I built one hatchery there at Muskogee. This hatchery shown in these Defendants' Exhibits 22 and 22-A is the only one I built, and changes which were made in operation were that of the change in fans, to which I have testified, and there were changes made in the thermostat control of the gas flow. In the incubating chambers and tray usage, direction of air flow and ventilating principles of the air flow, and the method of incubating with a forced draft, and

the structure of the egg trays, there were no changes made. There was a change made in the fan, due, as I testified yesterday, to the fact that we first installed a fan, because Mr. Lieber owned it and we installed it. Finding it did not give a sufficient volume and force of air, we secured the blower of more power. The diameter of the screw fan was either 16 or 18 inches. That is the fan which is shown in those photographs introduced yesterday.

Asked when he started the incubator in operation, the witness said:

A demonstration hatch to show that the incubator would control temperature and hatch eggs, was conducted, and the hatch brought off, as I remember, about the middle of January. That is the hatch, a picture of which appears in the Poultry Culture article. A small lot of eggs were set in that hatch. I don't know how many. You see the picture, you can judge for yourself. The chicks that are shown in this article in Poultry Culture are probably all that came off that demonstration hatch. I don't know. There is my picture. My memory wouldn't serve me any better after [fol. 791] 21 years. As to whether that was the 250 eggs as described in the column on the third page of the Poultry Culture article, I have no memory of that. I would have to refresh my recollection on that statement from the article. (Referring to article.) The details of that hatch are here given. It says, "250 eggs were placed in the machine and 164 chicks hatched". That is the demonstration hatch that I have been talking about, brought off early in January. That is the demonstration hatch which is illustrated in this photograph appearing in Poultry Culture. That is the same hatch which was illustrated in the photograph appearing on page 88 of this scrapbook, at the left except that it is a separate photograph. One is taken with myself, and the other with my assistant employee. They were taken on the same day. The photographs show them to be of the same hatch, with a different man shown in the picture.

Q. How were the eggs set in this hatch—set all at one time?

A. They were hatching all at one time.

Q. And were they set all at one time?

A. I think my answer is sufficient—they were hatching at one time.

It is very hard to get them to hatch at one time if set at different times. That was 250 eggs, as stated in Poultry Culture. I have no memory except refreshed by the Poultry Culture article. That was the capacity of one tray. The capacity of the machine, when in full operation, was approximately 30,000. Each compartment had room for 5,000 eggs, if all trays were filled with eggs in incubation, none of which being hatched. This was a demonstration, with a demon- [fol. 792] stration tray. It is not a demonstration of the hatch of the machine, but merely to hatch eggs. It was made in the winter before hatching season began, for purposes of demonstration, as shown.

I do not remember whether at the time that these two photographs were taken, the one in Poultry Culture and the one on page 88, there were any eggs in any other part of the machine. Probably there were not, as that hatch would have been started about Christmas, and it was not a hatching season. I presume that there were no other eggs in the machine but these 250. I do not remember positively. The eggs that were hatching at one time were all set at one time. I don't remember whether other eggs were placed in before one hatch was brought off and started or not. The other trays shown in these photographs were all empty. They are there to show the position of the trays. The article states that this is a picture of a demonstration hatch in the advance of season. It does not give any inference that the other trays were full.

I have no memory of the date when we started commercial operations in this Muskogee hatchery. As near as I can place it, I would say in the month of February. It was after these photographs were taken. I started operations with this Davidson fan which was gotten from the moving picture theatre. As to how long did I operate with that fan, I can't give you the specific time, but it was into the active hatching season, in the early part of it. The change of fans was made while the machine was in operation; that I remember. [fol. 793] This change of fan was brought about by the inadequacy of the first fan. I so testified. My memory is that the other fan was ordered from the American Blower Company, which I believe is located in Detroit. I don't know the date that the fan came in. I have not shown in the drawings the fan that came from the moving picture theatre. I have shown the blower which was used in the main bulk

of the hatching season, and which was the fan used when the machine was operated to its fullest capacity.

We ruined no eggs with the first fan in the sense that any complete hatch was a failure or all eggs in that incubator at any time failed to hatch. It was evident, from operations, that the fan installed was of insufficient capacity to adequately handle the added resistance of full egg capacity and to continue to equalize the heat, which was the reason for ordering the larger power fan. We wouldn't have ordered the larger fan if the first fan was adequate. We were still experimenting at Muskogee on the fan size. The fan is an essential part of the incubator. We were still experimenting at Muskogee on the size of the fan to give service.

Q. Didn't you ever experiment while you were at Muskogee with flumes to the different egg chambers from this fan?

A. There were no changes made in the flumes at Muskogee except such necessary change at the immediate point in which the fan blew the air direct from the fan, because of the different size of fan. There was a structural change made in mounting the second fan, but no change was made in the flumes beyond that point. I do not recall the state- [fol. 794] ment in Poultry Culture appearing on the second page of the article: "To accommodate this need, the inventor has ingeniously arranged that the air be divided after it leaves the fan, into two flumes. One of these passes into the heater and the other does not." I have no memory of experimenting with that sort of construction at Muskogee. My impression now is that the statement originated from Mr. Hicks, with whom I had discussed my plans and ideas of incubation at length, the summer before, and the statement, as made, would seem to refer to the idea of regulating the heat by diverting the air flow past the heater, but no such construction was actually used at Muskogee. I have no memory of furnishing that statement in detail. I do not deny I furnished that statement which appears in Poultry Culture, but I have no memory of it. I would presume that the statement probably originated from Mr. Hicks in my conversations with him. No construction as described or suggested in Poultry Culture was actually built.

I did not operate this incubator at Muskogee with eggs of one age in a single compartment, not a full compartment of eggs of an age. As to whether I ever operated it with eggs of one age only in a single compartment, I did, because a single tray in the test hatch would have been that. Whether, disregarding the demonstration hatch that I testified about, we ever operated the incubator at Muskogee with compartments in which the eggs of one age were placed in one compartment only, we never operated with eggs of the same age put in one compartment so as to materially fill the compartment. The practice was to keep eggs of dif- [fol. 795] ferent ages distributed throughout the different compartments, which aids in the equalization of the incubating chamber. I have no memory of testing this incubator at Muskogee with a compartment filled with eggs of one age. I do not deny that I did.

The slides provided in the top of the chambers were installed for the purpose of regulating the flow to the different compartments, but finding that the air flow was sufficiently distributed among the several compartments, the practice was, when operating to anywhere approximating full capacity, to keep all slides full open. The purpose of the slides was that of distributing the air flow. We experimented with them to find out if they were necessary for that purpose. We used them in blocking off chambers, as in running less than the full seven chambers. We did not find it was necessary to use them in full operation; hence they were run open. We used the slides, however, and adjusted the slides to various positions while the compartments had eggs in them, and while the compartments to which the slides were connected had eggs in them, and for the purpose for which they were intended—that if you were operating one compartment with a large number of eggs and were starting another compartment nearby with fewer eggs, then, the slide would be used to give more air to the compartment having more eggs, but after sufficient eggs were available to use all compartments to essentially equal amount, then it was found best to run the slides full open.

In these Muskogee hatchery drawings, Defendants' Exhibits 22 and 22-A, there are some differences between these drawings and the drawings which were in the Cooley [fol. 796] case. The chamber (G) in the drawings intro-

duced yesterday is divided by a vertical partition apparently extending the entire height of the chamber, and that is not shown in the drawings introduced in the Cooley case. The error on the part of the draftsman, in the Cooley case, is analogous to that shown in the Davis machine, as he did not conceive that the outlet of the fan was closed against the return air. That error has been corrected in the present drawings. As to calling attention to that error in the drawings when I was on the stand in the Cooley case, my memory of that is exactly as in the Davis—it is a similar error, whether it was brought up in questioning in the Cooley case or not, I do not know; I don't remember.

Q. That is, you find something in the drawings introduced in the Cooley case that you needed to put into this case, is that right?

A. For greater accuracy of detail, yes, sir.

Q. And the drawings which were prepared in Toulmin and Toulmin's office show this essential thing, whereas the drawings which were put in in the Cooley case do not show that?

A. They do not show that. I told the attorney handling that case that those drawings were inaccurate. He informed ~~me~~ that they were diagrammatic drawings to enable me to describe the principle of air circulation. The air circulation is correctly shown in both drawings, insofar as its direction of movement is concerned. The draftsman's error in not enclosing the outlet of the fan is obviously a point which would make the apparatus, if actually so constructed, inefficient, as it would merely waste air flow. It would be a back flow of the air in the fan chamber. In [fol. 797] that respect I did not improve my recollection of this thing in 1933 over my recollection in 1928. In that respect I knew that that error was there and called the attention of the attorney to it, who, as I have already stated, said that the drawings were sufficient for me to testify from, they were diagrammatic drawings only, and accurate enough for the purpose. I don't remember whether I called attention to that error when I was on the stand in the Cooley case. You will have to read the record. I have no recollection. As to testifying in the Cooley case that I made these drawings, my answer will be similar to that made in the Davis machine, that I stated the information

to a draftsman who made the drawings and who did not correct the drawings after they were shown to me.

These drawings in the Hastings Muskogee hatchery, introduced yesterday, were made in Toulmin & Toulmin's office within the last two or three weeks. Besides my recollection to base these drawings on, I had photographs and descriptions—no drawings. Those photographs are some of the photographs which were introduced in evidence yesterday. I am not holding back any photographs. I had not recently seen the photographs—all the photographs introduced—I knew of the photographs at the time. They were taken, in fact, with my own camera. These drawings were made from my recollection and from these photographs that have been introduced in evidence. There are no photographs that I am holding back. I haven't introduced any photographs which show this blower fan. The only photograph which I have introduced shows this fan which was inadequate. This particular fan that is shown [fol. 798] in these drawings, the location, is all from my recollection. It is not from any photographs or any contemporaneous records. These photographs were not all taken at the same time. The two photographs on page 82 were taken very early in the season. I do not know whether they were taken at the same time that the photographs of the demonstration hatch were taken. The photograph on page 84, showing the fan, was taken early in the season before the fan change was made. I don't know the date when that photograph was taken. I have no memory of that date, except that the fan was there, and that was in the early operation, as described. The photograph on the same page showing me putting an egg tray into the machine was probably also taken at an early date, but I am not positive of that date. It could have been taken at any time, from the contents of the picture. It was probably taken about the same time as the demonstration hatch. I can't say. That is not the demonstration hatch. It is the eggs. That photograph was probably taken at the same time as the demonstration hatch. I couldn't be positive. Page 86 shows a photograph of a large number of eggs in the machine, and was obviously taken later in the hatching season when the machine was in operation to or near full capacity.

As to the other photograph on that page, of the single

chamber, I cannot give the date, as it might have been taken at any time. I have already referred to the photograph on page 88 to the left, where I am shown. The demonstration hatch was back in January. The other photograph on the same page may have been the same hatch, I have no memory, but it very likely was. The photographs [fol. 799] on page 90, the full tray of white leghorn chicks, was taken later than these demonstration photographs, and probably well into the middle of the hatching season. They are chicks, as I remember, from Mr. Gaunt, which were the best hatching eggs we had furnished to the plant.

Comparing Exhibit 22-A with the photograph at the left on page 84, the photograph is taken with the camera in the chamber (B) focused through the door (M), showing the fan in position in the chamber (G) and showing the different arrangement of the wooden partition at the outlet of the fan, which change was made necessary to accommodate the two styles of fans. I will mark the approximate location of the camera with a cross on Defendants' Exhibit 22-A. I will indicate the direction in which it is pointed by an arrow. There was never any change made in the arrangement of the incubating chamber.

Q. Is this a corner appearing here on the photograph at the right, immediately adjacent to the fan—isn't that a corner?

A. May I answer that question by drawing on the floor plan the location of the partition on which the fan is mounted?

Q. I am asking you a question first—isn't that a corner?

A. It is not a right-angled corner.

This compartment in which the fan is located is about 3 feet high. The fan is delivering to the right of the photograph. It is delivering air at an angle slightly off from parallel to the row of trays into the passageway behind the row of trays lettered "N" in our drawing. This partition shown in figure 2 is not the partition at the back view. The [fol. 800] back view here shows the extreme rear of the incubator before the rounded corner shown in the drawings was put in place. This line marked X, which is seen running from the corner outwardly, is the thermostat.

The room shown on page 82 of the scrapbook (Defendants' Exhibit 26 for Identification) is the room indicated in the drawing by "B". That is the room that you enter

immediately as you come into the door (A). The camera was set outside of the incubator, photographing through the door (A). The panel that is shown in the lower part of the picture, directly behind, is the door (M). Above that is merely storage space. That is the door through which you got access to the fan.

The diagonal line across from the upper righthand corned of the door which shows beneath it is a partition set obliquely, provides space for the air flow under the full width of the incubating chambers into the fan chamber. That is the intake of the fan coming through there. The exit is at the rear. That is not the partition shown in the photograph on page 84. That construction is not shown in the drawings, Defendants' Exhibit 22-A. That is a detail of construction having no bearing on the operative principle of the air flow.

Q. But as I understand, this is the only contemporaneous record you have of the construction of the incubator, and yet you do not show that construction in your drawing, Defendants' Exhibit 22-A, that is correct, is it not?

A. The drawing is diagrammatic and that detail was not changed. That detail may have been changed in the installation, and the other fan was larger and was mounted differently in that chamber.

[fol. 801] Q. We are trying to arrive at a correct showing of the Muskogee incubator. The only contemporaneous records which you have are these photographs (Defendants' Exhibit 26 for Identification), and you haven't shown the machine shown in the photographs, on your drawings, Defendants' Exhibit 22-A, that is correct, is it not?

A. The details are not all on the drawings.

Q. You haven't shown the machine shown in the photographs?

A. I have shown diagrammatic drawings that illustrate the principle of air flow and mechanical incubation, not all mechanical or structural details are shown on the drawings.

Q. Then you got these drawings, Defendants' Exhibits 22 and 22-A up, for purposes of this case and not for the purpose of showing the incubator as it was actually constructed?

A. I got the drawings up to show the essential principles of operation of the incubator, which are being contested in this case.

Q. I am not asking you about the essential principles of operation which are being contested in this case. I am asking you about the incubator as actually built, and the drawings, Defendants' Exhibits 22 and 22-A, do not show the incubator as it was actually constructed, that is right?

A. It is not. It does not show full mechanical details, it shows the essential structural principles.

Q. You have selected what you call structural principles, and have neglected the actual construction of the incubator —that is right?

A. Neglected unimportant details.

Q. You have neglected details such as location of the fan [fol. 802] and other things of that kind in making these drawings, Defendants' Exhibits 22 and 22-A?

A. No, not the location of the fan. There is no alteration of the drawings to show any early position of the location of the fan. It is stated in the testimony that the fan shown in the photograph is not the fan illustrated in the drawing. One is an exhaust fan and the other is a blower.

Defendants' Exhibits 22 and 22-A do not show this ceiling about 3 feet high from the floor of the incubator, which appears in the photograph. The thermostat shown on those photographs, which were taken early in the season, prior to the commercial operation of the machine, is an electric thermostat. It was replaced by ether wafer thermostats, which were placed in the machine at approximate locations shown in the drawings. At the time those photographs were taken, I was merely working with this thermostat in that location. The machine was not in any commercial operation. The only contemporaneous evidence which shows the location of the thermostat in the position shown in the drawings, Defendants' Exhibits 22 and 22-A, is a gas feed pipe leading to the thermostat shown in the photograph on the right of the page 86 of the scrap book (Defendants' Exhibit 26 for Identification). That doesn't show the interior of the machine so you can't tell from these photographs where the thermostats are located. You will have to take my word for that.

In the photograph on page 82, the instruments shown in the righthand photograph are the electric thermostat referred to and a mercury float gas valve for the regulation of pressure, and with which I was testing the application [fol. 803] of the thermostat previous to the hatching sea-

son. The instruments shown at the left of the photograph on the left of page 82 are also the same—the gas pressure valve with a thermostatic control just referred to. It was not used during the actual commercial operation of the machine, and therefore not shown in the drawings, Defendants' Exhibits 22 and 22-A. I am testing eggs in these photographs. The photographs were taken early in the season and were taken for purposes of publication similar to the Poultry Culture article.

The photograph shown on the righthand side of page 90, shows more chicks in a tray than could be hatched from eggs in the tray, and is a pretty picture. The trays are not shown in the incubator. That was simply a way of photographing a niee bunch of chicks, taken in the sun-light outside. If you find that I made a statement that those represent the chicks actually hatched in those trays, then I concede that your term "stuffed" might apply. I didn't say the answer was yes. I qualified that yes.

Q. The answer is yes—those trays have been stuffed for the purpose of taking a picture?

A. That is your language.

Q. Isn't that correct?

A. I didn't use the language except at your suggestion.

Q. I wish you now would take these drawings, Defendants' Exhibits 22 and 22-A, and draw in the construction shown in the photograph (page 84)?

Mr. Greer: Let the record show that the witness thereupon sketched in, in red pencil on Defendants' Exhibit 22-A, the location of the construction as requested.

[fol. 804] Q. Now, put in the water pan.

A. That would have to be dotted in.

I see where you have got me—the angle of the fan is first drawn and it is not quite correct. That water pan appears to be about 4 inches deep. It would appear to be about 18 inches wide and somewhat longer. It appears to be a rectangular pan in the photograph. It was rectangular, quite obvious.

Q. Then your fan wasn't set at an angle the way you drew it now?

A. The fan was not set at as much of an angle as I drew it. The effect in the photograph of fore-shortening gives an illusion of the partition on which the fan is mounted, being not parallel to the opposite wall, but upon my attention

being called to the rectangular pan, I see that this is an illusion. I don't know whether that wall is perfectly rectangular—perfectly at right angles to the back wall. I remember this fact quite positively, that the width of the fan outlet being greater than the width of the passageway at the rear of the egg chambers required that the flow of air be narrowed and brought into wedge shape. My presumption, as made in the drawing a minute ago, of the angle being somewhat oblique, is the facing of the fan towards the center of this flow, and because of the wedge-shaped construction of that immediate passageway into which the air flowed directly from the fan. As a matter of fact the fan was set in the position to force the air from it into the passageway, in the drawings marked "N". The exact angle in construction I do not have from memory, and from the illusion of the photograph, have been in slight error as to [fol. 805] the obliqueness of the angle. This I do know, that the purpose of the compartment or box shown in the photograph is to receive the flow of air from the fan and narrow it down and lead it into the passageway (N).

Q. As a matter of fact, even looking at this photograph, you can't remember very much about the construction of the incubator, can you?

A. After 21 years I cannot give it in inches. I can give it in principle of the purpose and direction of the air flow.

Q. I am not asking you that. I am asking about the construction of the incubator, not the construction of a principle you had in mind, or something you thought about later. I am asking about the actual construction of the incubator as it was, not one you had in mind. Will you state whether or not this fan was set at an angle or not?

A. Angle to what?

Q. Whether it was set at an angle to the back wall or whether it was right angle to it—set obliquely to the back wall?

A. As the evidence of the rectangular water pan shows, the fan was not set obliquely to the back wall, but I still insist that the partition shown at the right, showing the chamber into which this fan blows, is oblique to the back wall. None of that is shown on the drawings, Defendants' Exhibits 22 and 22-A, because the drawing shows a larger fan, which was a blower, and the size for which and the space for its motor required a different mounting or plac-

ing in the chamber, as shown in the drawings. We don't show the horizontal partition 3 feet up from the floor in our drawings. That partition was merely a bench to use for storage space for boxes. The ceiling above the fan is the bottom of the bench shown in the photograph on the left-hand page 84.

[fol. 806] I cannot state the time I operated the incubator with the fan as shown in the photographs. It was at the beginning of our operations, that fan was used in the early part of the commercial hatching—in the beginning of the commercial hatching. The article appearing in the Poultry Culture Magazine says: "Mr. Hastings proposes to incubate 60,000 eggs under this roof at one time". That statement was of a proposal of construction, half of which was constructed, the space in the building providing for the other half of the construction after business had later warranted it. We never did build this and never claimed it. Our business never did warrant expansion.

At the last of this article in Poultry Culture it states: "If the Muskogee plant continues to do good work during the present season, Poultry Culture will advocate a Hastings hatchery as a feature of the Kansas Agricultural College new poultry department for 1913." No such installation was ever put in the Kansas Agricultural College.

(Recess taken to 1.30 P. M.)

Comparing Exhibit D-J in the Cooley case and the drawings prepared in Toulmin and Toulmin's office: The blower (I) in the Defendants' Exhibit D-J for the Cooley case appears to be drawn somewhat smaller than that in Fig. 3 of the drawings in the present case. None of these drawings are exactly to scale, and my testimony as to the size of the blower and its make is exact—an 8 inch outlet Sirocco blower, standard at that time. The drawings that I put in this case appear to show the fan larger than the drawings [fol. 807] shown in the Cooley case. Neither drawing is to scale. The drawing of the blower is larger in the present drawings—later drawings. I do not know the exact number of eggs we had in this Muskogee incubator at one time. I know that the machine was filled to such capacity that there were no more available trays, and that we, at times, were obliged to delay the putting of eggs in the incubator for a day or two to get space. I distinctly remember that

it was filled to capacity, and eggs were delayed in entrance at one or more times. One time is all I can possibly testify.

When I came to Muskogee in 1911, and endeavored to interest the Commercial Club in backing my hatchery, I believe I was referred to Mr. Lieber. I cannot testify as to the exact amount Mr. Lieber agreed to furnish, but I presume that to be correct, $1,000 to start the business. I believe it is correct that Mr. Lieber and I organized a corporation under the laws of Oklahoma, under the name of the Hastings Hatchery. Just a minute, I think I could supply the names of the incorporators of that company, I am not sure. Such company would have probably had—this is not positive testimony—Mr. Lieber and myself, probably Mrs. Lieber, and a man who was Mr. Lieber's law partner, by the name of Ed Hastain.

I have no positive memory that the corporate shares of the company were divided, 50 per cent to Mr. Lieber, 49 per cent to me and 1 per cent to Mr. Hastain, but my impression is that that is correct. I didn't put any money in it. I had no patent. I may have agreed to assign a patent if I secured one, to such corporation, I probably did, I have [fol. 808] no memory of that transaction today. Very probably I agreed to assign the patent, if it issued on my then pending application, to the corporation. I have no memory today except as you refresh it by that statement. Whether that was the consideration for the 49 per cent of the stock that I got that impresses me as reasonable and probable. I am taking your word for that; you may have a record of it. I have no direct memory of that detail. I do not deny it.

The first demonstration hatch undoubtedly was from our own eggs. We operated with our own eggs for a while and continuously with eggs that we purchased, the chicks of which we sold throughout the season, but the bulk of the operation was custom-hatching.

Our custom-matching came quite early in the season, but the first test hatches were from eggs we owned. The custom-hatching came afterwards but at the beginning of what would be considered the hatching season. It was not a change in plan. The plan was from the start to do custom-hatching.

I do not remember that a Mr. Richard Shanafelt brought 200 eggs, and he only received three chicks. I do not remember that after that one experience that Mr. Shanafelt

had with our plant, he never brought any more eggs in. He probably would not. I don't remember Mr. Shanafelt. I do not remember a Mr. L. A. Corey. I do not recall that Mr. Corey three or four times brought in 100 eggs at a time and never received a single chick. I have no memory of it. I do not remember that a Mr. S. J. Anderson brought in 200 eggs to be hatched and only got five chicks out of it. [fol. 809] I do not remember it. I don't deny it. I do not remember that the matter of my faulty hatches was taken up by me with the Muskogee Poultry As-ociation or that they kicked to me about it. I do not remember that they made it pretty hot for me there in Muskogee. Mr. Ed Hastain kept the business books of the business operation. I remember Mr. Hastain working as Mr. Lieber's active representative, and keeping books and accounts. I was mainly engaged in the actual manual operation of running the hatchery. I undoubtedly made book entries and kept records also.

There were some records kept of our operations there at Muskogee, the extent of which I do not remember. There were books kept. There would have been books kept of money received and expended, and also records of eggs received, and chicks sold or chicks turned back. I don't know anything about the existence of the books. They would have been left with Mr. Lieber and Mr. Hastain at the time I left there.

Q. Mr. Lieber testified in the Stone case, that you got disgusted and left and turned the business over to him. Is that true or is it not true?

A. It is true that I left Muskogee after the main bulk of the hatching season was over, and that I went from there to Petaluma, California. The term "disgusted" is an expression of opinion of feeling. I left with no enmity or quarrel with Mr. Lieber, because I recall that he gave me $100 that he did not legally owe me, to enable me to go to Petaluma, gratuitously. I was receiving as a small salary or wage from Mr. Lieber or this corporation, and enough to enable me to exist there, and the $100 that Mr. Lieber gave me was [fol. 810] a gratuitous gift because my wages had been too small to permit me to have any surplus, and there was no profit shown from this operation. I left the employment of Mr. Lieber and this corporation and went to Petaluma.

Q. That is, you gave up your 49 per cent of the stock and skipped out, didn't you?

A. I do not think that I skipped out when Mr. Lieber gave me $100 gratuitously to go to Petaluma.

Q. But you skipped out of Muskogee?

A. I left Muskogee.

Q. What time did you leave?

A. May, 1912.

Q. What date?

A. I do not know.

Q. Wasn't it during the hatching season?

A. There were some eggs still in the incubator.

Q. Wasn't it during the hatching season?

A. Yes. The hatching season in that locality may go through June now; it did not then. It was a very hot locality, and June chicks would be very unprofitable in that locality. I left during May when the hatching season was on. I left at night if the train left at night.

Q. You didn't go around and tell the people you owed money to that you were leaving?

A. I did not skip any personal debts there. If the hatchery owed any debts, Mr. Ed Hastain was left in charge of this operation and was secretary of the company, and hence I did not leave any debts in Muskogee personally.

Q. Did you go around and tell your acquaintances that you were leaving before you left?

A. I had very few acquaintances there. I had been very busy while being there. I don't remember any business of a personal nature one way or another. I never go back to Muskogee. I have no personal friends in Muskogee.

[fol. 811] Q. Did you ever go back to Muskogee?

A. I did not.

Q. Never been back to see your old friends?

A. I have not, I have no personal friends in Muskogee. I remember that Mr. Lieber took a considerable number of chicks, but don't remember how many, nor do I know how many pullets he raised from the chicks he took from the hatchery.

Q. Do you know whether he got more than 500 chicks out of it?

A. You said pullets.

Q. I will say chicks, both pullets and cockerels—do you know whether he got more than 500?

A. I don't remember how many he took.
Q. Did he ever make any money out of it?
A. No.
Q. Did you ever make any money out of it?
A. No.
Q. Nobody ever connected with it made any money out of it?
A. No one made any profit.
Q. No one made any money out of it?
A. No one made any money out of it.

I do not know whether that incubator is still there, but I have every reason to believe it is not. It was torn down. It was located in a building, part of a building, in the very center of an oil booming town. It was right adjacent to a theatre and a hotel.

Mr. Lieber never built another incubator like it, to my knowledge. I don't know whether he did. I have built other incubators since that were similar in principle of operation to the Muskogee incubator. I never built another incubator exactly like the Muskogee incubator. I built some other incubators, but they were different.

[fol. 812] I tried to get somebody to put more money in the incubator out there in Petaluma, but did not succeed.

I next appeared at a place called Port O'Connor, Texas. There was a land development promotion scheme there. That boom town was a small town—it was a small town being developed or boomed by a real estate operator who employed me to come there and work and build a hatchery. I built the building there for a hatchery and made part of the interior installation in the fall of 1912. The boom town or real estate development referred to was not going so good, and the Real Estate company were moving out of the town back to San Antonio, and did not care to employ me to stay during a hatching season and operate any incubator. I never finished that incubator in Port O'Connor. I was simply discharged from my position because of the general failure of the company that was developing it, and their desire not to go ahead with the plant. The rated capacity of that incubator or capacity provided for in the building, was to have been in the vicinity of 100,000 eggs. It may have been stated as 150,000. The interior construction was never completed. My memory is that the framework of the incubating chambers, or the partitions between them, were

completed, and that a single compartment was fitted up with trays, and the machine heated up, and a single hatch made in this one compartment, the other compartments being closed.

Referring to Defendants' Exhibit D-1, in the Cooley case, an article entitled "Hatching Chickens by Wholesale," refreshes my recollection as to the prosepective size of the [fol. 813] hatchery. I remember that structure, I built it myself. The rating, I think, in that, was ten compartments of 10,000 eggs each, and on the other side, open trays arranged without turning devices, to half of that number. As the entire installation was not made, I have no accurate memories of it, I am testifying about a capacity that was predicted or stated that was planned. It was never fitted or used except one chamber heated up to demonstrate heating control, and it was not operated at any time, and no attempt made to operate the thing commercially. The one compartment that was built was about the same size as the compartments in the Muskogee plant, but it was fitted with the device for turning the eggs by turning over the whole compartment. Therein it differed from the Muskogee incubator, quite so, in that respect.

It had a fan installed at a different place from the Muskogee machine at the end of the row of incubating compartments, and the principle of air circulation planned and partly constructed was that of blowing the air into a long passageway, from which it would enter into the individual hatching chambers and then pass through them into a return duct, and so return to the fan.

This demonstration hatch I have testified about in Port O'Connor was made late in the fall of 1912, shortly before I left there, but not in the hatching season. As to there being two cases of eggs, I think your memory there seems to be better than mine. I think probably two cases, 720 eggs in an incubator of 150,000 capacity. The purpose of making that hatch was merely to test the operation of the [fol. 814] continuity of our heat, chiefly, which having no gas, we were using a gasoline burner which was decidedly an unproven thing. I had previously operated with gas and it was to work out and demonstrate the regulation of the gasoline burner was the chief purpose in my own mind of running the hatch. In that demonstration hatch at Port O'Connor we probably set the eggs all at one time. If two

cases were purchased at one time, they would have been set at one time. I have no detailed memory of that. I don't remember more than I have told you.

That compartment itself in which these 720 eggs were set had a very large capacity. My impression is that was rated at 10,000, and that the rating was obtained by a plan of putting those eggs in on their sides very close to the next tray so that they were slotted trays, trays made of strips, a method which I had observed in Petaluma on my visit there, and which I was installing in this machine, with the added device of turning the eggs—a labor-saving device. After that one demonstration hatch where 720 eggs were used in a compartment designed to hold 10,000 eggs, that incubator wasn't used. It was not in the hatching season, and the purpose of the test or demonstration was not that of testing the air flow or the use of the hatchery as a whole, it could not have been presumed to have been so. It was merely for the purpose of testing the heat and temperature control of this heating device. I have no reason to know that incubator at Port O'Connor was not used after that one demonstration, but I do know it was not a poultry country. I do not know that it was not used after that demonstration, but I presume that is correct.

[fol. 815] Q. This article in the Technical World of April, 1913, where it said, "There is now in operation at Port O'Connor a machine capable of turning out a chick every twelve seconds for twenty-four hours a day and for three hundred and sixty-five days in a year"—that isn't true?

A. No. That is a statement made, as in many of these mechanical and similar magazines, as to new constructions, when the impression is given that something is in operation when they had information as to its planning or building.

That isn't so, it is a presumption. The article says: "There is now in operation at Port O'Connor a machine capable of turning out a chick every twelve seconds for twenty-four hours a day, and for three hundred and sixty-five days in a year." I am not responsible for that article. It is not an exaggeration, it is a misstatement. The picture which appears in the same article over on the next page, is not a picture of anything at Port O'Connor, it is a picture from the Muskogee plant. I don't know whether

there is anything in that article which says that is the Muskogee plant. There doesn't seem to be any statement as to where this Muskogee picture originated. A reference is made to the Muskogee hatchery. The article is written by a man named George F. Paul, whom I do not know and never met, and the photographs were furnished him by me, and some of the data. He has used his imagination and speculation in writing up the article, as shown from the data he had. I did not see proofs or copies of the article and am not responsible for the misstatements made. I never denied those statements in that publication.

Regarding the article appearing in the Boston Sunday [fol. 816] Globe, November 10, 1912: "At Port O'Connor, with more eggs and more funds at his command, Mr. Hastings has far excelled his previous efforts and has here begun operating what is unquestionably the greatest hatchery ever built," at the date of publication, the Port O'Connor plant had not been completed even to the state that it later was. The statements made are speculative on the part of the writer, from information and photos furnished by me at various times in other publications. I deny the reponsibility for that statement except the quotations which I presume the writer has directly quoted me under direct examination. I never saw the writer of that article. I never knew the writer of an article which appeared in a St. Louis paper. I sent him photos. I remember corresponding with such a man, sending him photos and clippings, and writing him letters, but I do not know what statements made there he might have taken from statements made by me in correspondence and what statements he might have made, as is customary in Sunday newspapers and similar types of articles concerning new devices and inventions.

Q. As far as you know, the only source of his information was what you furnished him, isn't that so?

A. I don't know as to that.

Q. I said as far as you know that is the only source of information he had, from which this article was written?

A. As far as I know, yes, I can presume that he might have seen clippings of other articles, or he might have been in correspondence with Mr. Hickox or other men who were interested and writing similar articles. Mr. Hickox didn't know anything about the Port O'Connor plant. No other

[fol. 817] article had appeared about my Port O'Connor plant before this article that I know of.

This article says, in referring to my Oklahoma operations: "The seasons were severe and the hatches were disappointing to many customers." That is a statement of the truth. We were operating custom-hatching there in a country where very little was known about producing good fertile eggs, and as I have stated, the hatches received by many of these customers, especially earlier in the season, were disappointing.

I do not admit any failure at Muskogee of hatching successfully from a good quality of eggs. I admit the commercial failure, and call your attention to the fact that we made the absurd mistake of offering to hatch eggs at the ridiculously low rate of one cent an egg. We had many disappointing hatches.

Regarding the statement in the Sunday Globe article: "With the improved mechanism, Mr. Hastings is finding out other ways to better the hatching results of the cruder machines." that refers to previous machines that I had built, as interpreted by that writer from information that he may have gotten from me or from other sources.

After I left Port O'Connor I returned to New York City. Strictly speaking I did not get a job with the Hall Incubator Company. I became associated with Mr. Peters, and I think, other officials of the Hall Incubator Company, in the capacity of establishing a corporation for the purpose of manufacturing incubators in accordance with the use of mechanical or forced draft; in accordance with previous incubators.

[fol. 818] While working at Little Falls for the Hastings Corporation, associated with the Hall Incubator people, I built a section with the view of making a manufactured incubator as entirely distinct from the hatching plants that I had previously built in place. They never got on the market. The reason was that a single compartment was built with a view of developing the type of manufactured incubator in sections. That is a sectional type incubator, for manufacturing purposes as distinct from a hatchery or incubator built in place, as the previous machines, which is the reason for the distinction. The design of this incubator was that of a fan or forced draft machine with the fan and heater in a separate detachable end member,

against which were to be placed incubating sections, with a view of expansion or extending these sections as the incubating capacity would increase.

At the insistance of Mr. Peters of the Hall Company which was a manufacturer of a hot water type of heater, I tried the use of a hot water heater for a single section of this incubator, with a view of finding if such hot water heaters could be adapted to such use—I protested in advance that I doubted if it could be—Mr. Peters being the manufacturer and seller of such heaters, wished me to test it out, and the result was that I cooked or overheated and destroyed the first and only batch of eggs in my experience with incubation up to this time. This displeased Mr. Peters and discouraged him with going ahead with the construction of the type of machine, and such construction was indefinitely postponed. Mr. Peters offered me a position as sales manager of the Hall Incubator Company, which I [fol. 819] refused, and I left Little Falls, New York, and went to San Francisco in connection with some publicity work promised me there in connection with the World's Fair being built there at that time. My connection with the Hall Incubator Company and my attempt to make incubators got nowhere. That was in the spring season of 1913.

The next time that I appeared upon the scene of incubation was in 1917 and 1918, at Tiffin, Ohio. I remember that on my way to Tiffin, Ohio, I stopped off at Cleveland and saw Dr. Smith. I do not remember asking Dr. Smith to give me a license under his patent. I do not deny it. I went to see Dr. Smith with a view of discussing any possibility of our joining forces, as we at that time were both interested in incubators of the forced draft type. Believing myself to have been the original inventor of this type incubator, and knowing that Dr. Smith was then building and operating and interested in similar types of incubators, I thought that he might see fit for us to join forces—some agreeable arrangement to develop the industry. I found he was disinclined and very suspicious of me and refused to let me see his hatchery. I therefore decided that he did not care to do business with me.

Q. As a matter of fact, Mr. Hastings, did you not ask Dr. Smith for a license under his patent, and as a consideration for that license, didn't you agree—didn't you offer to agree that you wouldn't do anything to upset Dr.

Smith's patent? In other words, you offered the price of silence for a license under Dr. Smith's patent—isn't that true?

A. I do not remember the detail of any suggestions or [fol. 820] correspondence that I may have had with Dr. Smith at that time, except the general intent to co-operate with him in this field instead of competing with him. I do not remember that the co-operation I asked for was a license under Dr. Smith's patent. I do not deny it. I do not remember the detailed conversations or correspondence with Dr. Smith. I remember the intent of them, and without refreshing my mind on dates, I couldn't say, but it is my impression that Dr. Smith's patent was not issued at that time, it may have been, but if so I do not know that I knew it. I know he was operating a similar means of incubation.

I then went to Tiffin with Mr. and Mrs. Hoppel. She had been the one interested in operating the hatchery, and Mr. Hoppel desired me to come there and take over the opration for the reason of relieving his wife of work he did not wish her to continue. I built some hatching compartments in a building that was the adjoining room to the incubation rooms that they had, and did operate in it successfully. At Hoppel's plant I tried out a method of hatching very much more like the Smith Buckeye devices than I had used in the past, but the reason was that Mrs. Hoppel had seen the Smith Buckeye devices and she believed me to be the original inventor of that type of incubation, and therefore did not conceive that she had no right to have such machine built by me. She wished the construction to be of the type it was made, because that impressed her as being a construction that she wanted to use because it was more similar to incubators she had seen in operation.

Q. As a matter of fact, wasn't it because you wanted to [fol. 821] see what that method would do in comparison with your previous experiments, did you not so testify? While you are pausing to think about the answer—did you not so testify in the Cooley case?

A. I would rather answer your question without looking at my testimony in the Cooley case and the reason is that

I was interested in seeing if the method used would operate. It was in some ways a simpler and less expensive method than mine, because it was less restriction of air flow—did not require as powerful fans.

Referring to my testimony given in answer to cross-question 146 at page 121 of the Cooley record I will stand by that testimony. That Hoppel affair wasn't a success financially. It wasn't a success, and I will give you some reasons: I was operating there in a business established by Mrs. Hoppel. It was quite large and it had elements of failure in her hands, due to the fact that they were operating with home built hot water pipe incubators. I supplemented that capacity with the fan compartments referred to. The hot water machines were very poor in operation, and my fan chambers did give better results. The gas pressure was unsatisfactory, and we had a severe season, and owing to failure of gas pressure, we at one time spoiled quite a large batch of eggs in the Hoppel's hot water machine, but did not spoil the eggs in the fan machine at the same time, because of much less heat required, the gas pressure being sufficient to handle that machine but not the hot water. While I was at Tiffin I published or composed this article which appears in the Count-y Gentlemen of August 10, 1918.

The book entitled "The Dollar Hen" contained a great [fol. 822] deal of practical information, and contained considerable speculative discussion of further development in the poultry industry.

Q. I call your attention to the top of the third column of the first page of the Country Gentleman article, where it says: "Ten years ago, I wrote an impractical poultry book."

A. I see the statement. May I add to that statement, by saying that ten years ago, at that time (referring to "The Dollar Hen"), I made statements concerning incubation which were considered impractical at that time, and were so looked upon by the poultry journalists, but that they were prophetic, in many respects excellent indications of later developments in this method of incubation and also other features of the Poultry Culture.

Q. As a matter of fact, what was said was: "Ten years ago I wrote an impractical poultry book." You also said "it was impractical because it told too much about how the

poultry business was going to be conducted in the future instead of how it was being conducted at the time."

A. That is fine—that represents what I have just said.

Q. And in 1918, you said it was an impractical book?

A. Prophetic books and prophetic statements are always considered impractical at the time they are published, and are impractical in details. They often do, as this book did, prophesy the developments which the writer for-sees ahead of others in the industry.

After I left the Hoppels I did nothing more with the commercial industry of incubation. I went into work that I have been at as a means of support most of the time since [fol. 823] I left the Department of Agriculture—that of a writer of varions publications. I occasionally wrote some on poultry and incubation in the years in which I was following that art, and have since chiefly written on the subject of human nutrition, animal nutrition and many other subjects. I dropped incubation.

Q. You have always considered that the reward which Dr. Smith got really belonged to you, didn't you?

A. As a primary inventor—if my primary invention had been considered patentable I would have considered that the returns, as an inventor, from forced draft incubation, would have belonged to me, but it was held by the Patent Office that the method was not patentable because it was an adaptation of devices and known principles in the art of ventilation to a new purpose, and as such was not patentable. Accepting the Patent Office's interpretation, I see no basis upon which a monopoly should be granted to me or Dr. Smith or anyone else.

Q. And you have always been motivated, have you not, by a comparison of the success which Dr. Smith obtained over the failures you obtained?

A. I think it natural, that an original inventor, a man believed himself to be the original inventor of a basic principle, which another man later develops and attempts to monopolize, would feel some element of resentment that he did not share in such returns.

As to Judge Westenhaver's statement in discussing the article in the Poultry Culture Magazine and other magazines that: "These articles discus functions, principles and results and indulge in rose-colored predictions," the

article in Poultry Culture specifically was published in [fol. 824] February, 1912. It has written into it much optomistic, or if you please, rose-colored predictions of the large developments and revolution in the incubation industry, which forced draft incubation anticipated, and has since materialized. The article in the Sunday Globe is a typical Sunday newspaper write-up of a speculative, inaccurate and loose nature.

Q. And no one that was ever connected with you, either Mr. Davis, the Muskogee people or the Port O'Connor people, ever made any money out of your schemes, did they?

A. No one connected with any of those three enterprises was in the incubation or hatchery business or knew anything about it.

Q. The answer to my question is that they did not?

A. And they did not make any money out of it.

I cannot testify positively that Mr. Searle before he wrote the article came down and saw the plant. I knew Mr. Hicks very well, but I do not distinguish Mr. Searle in memory. He was Mr. Hicks' assistant, and my impression is—of which I cannot be positive—that Mr. Searle possibly covered the Muskogee poultry show, which was held at about that time, and therefore was probably one of many visitors that came over to see the plant, which we were just then constructing and running a test hatch in at the time of that show. My memory is Mr. Hicks visited that plant at Muskogee somewhat later in the season than the time we were speaking of. I think he came after the article appeared.

Q. You testified in the Cooley case, on page 144: "The names signed to any of these articles that have been shown [fol. 825] at this trial are written by men that, so far as I know, did not visit the hatchery: That is a Mr. Searle who signed the article in the Poultry Culture, and Mr. Paul in some other publication, whom I did not know personally."

A. The statement is absolute in regard to Mr. Paul and Mr. Searle. I have just given my impression of the probabilities of that. My memory is not distinct.

Q. That is, you have no recollection of his being there?

A. I don't recall the man. I knew Mr. Hicks very well. He was merely Mr. Hicks' assistant, writing under his direction.

Q. When did Mr. Hicks visit you at Muskogee?

A. Sometime during the hatching season, that is all I can remember. I don't remember the date.

Q. Do you remember Mr. Hicks discussing with you the possibility of opening up a similar hatchery at Topeka?

A. Mr. Hicks was interested in that and tried to interest Senator Capper, with whom he was working, in such an operation.

Q. Do you remember saying to Mr. Hicks that you were unwilling to undertake it because your efforts at Muskogee had not been demonstrated sufficiently to make you confident you could do it—do you remember making such a statement?

A. I don't remember the exact statement, but as a commercial success in custom-hatchery, with miscellaneous foreign eggs, the statement would have been a very logical one. It was commercially not a success.

Q. It was not sufficiently a success as a business proposition to encourage any further development at that time, is that correct?

[fol. 826] A. In that region. That is why I want to Petaluma where the interest was well developed and there was plenty of eggs to hatch.

I did not do anything at Petaluma. I had no personal introductions, and those fellows didn't give me a job.

Mr. Ely: I wish to introduce as Plaintiff's Exhibit 1, the testimony of Milo M. Hastings, at pages 75 to 154 of the Cooley record, and also the exhibits which form part of the Cooley record, namely what was then the Defendants' Exhibit D-C, a pamphlet entitled "A Million Egg Incubator"; Defendants' Exhibit D-D, the drawing of the Davis hatchery of 1910, incorporated in that record; Defendants' Exhibit D-E, a certified copy of the abandoned application of Hastings; the article in the Boston Sunday Globe, which was Defendants' Exhibit D-G in that case; the drawing of the Hastings Port O'Connor hatchery, which was Defendants' Exhibit D-H in that case; the article "Hatching Chickens by Wholesale" in the Technical World, Defendants' Exhibit D-I; the drawings of the Hastings Muskogee hatchery, in that case, Defendants' Exhibit D-J; the article in the Country Gentleman of August 10, 1918, which was Defendants' Exhibit D-L.

Redirect examination.

By Mr. Greer:

I first read a book, and I think a patent on refrigeration by Mr. Cooper, and then went to see Mr. Cooper, with a [fol. 827] view of interesting him as an engineer in the possible development of a process of incubation which I conceived to be a use, in incubation, of his device in refrigeration.

Q. Is he the same Mr. Cooper who is the patentee under Patent 754749.

A. Madison Cooper, a ventilator expert—I believe it to be the same. It was a refrigerating patent—it was the only one under consideration.

Q. You were also asked if your activities at Muskogee in connection with the use of a fan in your incubator, were experiments or not. Will you please state to us what was the result of any such experimental use of a fan in connection with that incubator?

A. In the very material increase in size from the Davis to the Muskogee incubator, the question of the size of fan and its air-driving power was one which would not have been known and could only be established by a trial. We therefore made a trial use of the fan which Mr. Lieber had, and upon finding it to be of insufficient air-driving power, we substituted the larger blower which was found to be of sufficient power.

On cross-examination I was asked with respect to changes made in the drawngs which have been introduced in this case as Defendants' Exhibits 21, 22 and 22-A, over the drawings which were introduced in evidence in the Cooley case. I suggested such changes being made, because the drawings in the Cooley case were inaccurate in certain details.

Regardless of any contemporaneous data, such as photographs, drawings or anything else, I have positive independent recollection of the construction and operation of [fol. 828] the Muskogee 1912 incubator. From that standpoint alone I will state that the drawings, Defendants' Exhibits 22 and 22-A are not complete or detailed working drawings of all mechanical details, but insofar as they show parts, arrangement and essential principles of use, they are accurate of the machine as it was used commercially and

successfully during the major portion of the hatching season at Muskogee.

I was also asked if the fan shown in the drawings which were introduced in the Cooley case was not smaller than the fan shown in Defendants' Exhibits 22 and 22-A. Those drawings are not to the same scale, not to the exact same proportion. The drawings in the Cooley record are smaller.

On cross-examination I was also asked questions with regard to the testimony of Mr. Lieber in the case of Buckeye Incubator Company, et al., v. Stone. Referring to the report of the Master of Chancery on page 5 of the Stone case, the following quotation occurs: "John G. Lieber, who was financially interested in the Hastings hatchery testified that hatches of about 50 per cent. were obtained." That is a correct statement. In referring to the Hastings hatchery, that refers to the Hastings hatchery of 1912 at Muskogee.

Recross-examination.

By Mr. Ely:

Q. In regard to that testimony of Mr. Lieber's do you know also whether or not it is correctly stated by the Master, immediately following the quotation read you by defendants' counsel: "It is apparent, however, that Lieber [fol. 829] was interested and more or less hostile, with the hope that at some stage of the litigation of Smith's patent and the infringement suit brought by the Buckeye Incubator Company v. Cooley, he might receive a return of money he lost in the Hastings venture." Do you know about that?

A. I know nothing about this testimony nor how Mr. Lieber may have felt after I left Muskogee, but the fact that he had interest in a prospective patent for which I had then applied, as has been brought out in this testimony, would give a reasonable basis for that presumption.

Q. Also, do you know whether or not it is true, as stated immediately following: "His knowledge (Lieber's knowledge) of Hastings' machine is dependent upon memory. His knowledge of the operation is rather vague, and the fact remains that the device was abandoned and it was not a success." Is all of that statement true, or what part of it is true?

A. The statement would seem reasonable to me, interpreted that the commercial operations of the incubator as a money making factor were not a success.

Mr. Lieber was busy on other things, but his office was in the same group of buildings, and he followed the operations to a considerable degree, and was interested in them, but he had many other business enterprises which distracted him somewhat from a close observation of the incubator. He was not an incubator man, and his detailed knowledge would not have been great. In regard to my changes in the drawings of the Muskogee and Davis hatcheries, over the drawings in the Cooley record, I discussed the drawings in the Cooley record with Mr. Schaefer (of the firm of Toul-
[fol. 830] min and Toulmin). I had the Cooley record before me at the time, but at that time I did not know that further drawings were to be made. Toulmin & Toulmin made such drawings and mailed them to me and I criticized them and the alterations were made by my criticism by correspondence. Recently I had a conference with someone from Mr. Toulmin's office, within the last two or three weeks.

At the conference I read some of these decisions that have been passed out on the Smith patent. I discussed the matter of these decisions with someone from Toulmin & Toulmin's office before I went on the stand. I am somewhat familiar with the language used in the various Courts in disposing of my so-called prior use, by reading. I would not be able to recall them all by detail. I am being paid for my time here. I positively have no promise of any more pay if my testimony is instrumental in upsetting the Smith patent.

I believe, except for a little exchange of correspondence, this makes the fourth day that I have spent on this work.

Redirect examination.

By Mr. Greer:

With regard to the record in the Cooley case that I said was shown to me at the time of my conference with Mr. Schaefer, I obtained that record from the office of Kiddle, Margeson & Hornidge. It was returned to that firm, the same day on which Mr. Schaefer and myself consulted here in New York.

[fol. 831] Deposition of NORMAN B. HICKOX Taken Nov. 11, 1933, at Chicago, Ill.

NORMAN B. HICKOX, a witness called on behalf of the defendants being first duly sworn according to law, testified by deposition which deposition was offered and admitted in evidence as follows:

Direct examination.

By Mr. Rowan A. Greer:

My name is Norman B. Hickox. I am 46 years old and reside at 725 Michigan Avenue, Evanston, Illinois. I am employed by the Curtis Lighting, Inc., at 1123 West Jackson Boulevard, Chicago. The Curtis Lighting, Inc., manufacture and sell lighting equipment. I have been with my present company for 17 years. During all of that time my principal office was located in the City of Chicago, Illinois. I lived in Muskogee, Oklahoma, from the early part of 1910 to the early Fall of 1912. I was the contract agent or commercial manager for the Muskogee Gas & Electric Company. Because of the nature of my business I knew practically every business man and commercial business in the city. I was familiar with the general business and economic conditions in Muskogee during the years 1911 and 1912. During the three years I was in Muskogee the city was in the height of its boom. The big growth of Muskogee started in 1910. Everything grew very rapidly and values expanded, the city expanded during those three years. It was typical Oklahoma boom country with all that that brings. I knew a Mr. Milo Hastings in Muskogee, Oklahoma. He [fol. 832] was in the hatchery business, in that city. I first became acquainted with Mr. Hastings in the late Fall of 1911 and knew him for some months after that or up into the early part of 1912. I became acquainted with Mr. Hastings in the same manner that I became acquainted with any new man that came to the city and engaged in any business in which he would use either electric current or natural gas that our company furnished; by contact with him in order to arrange with him for supplying such service as he would need in his business. I stated that he was engaged in the hatchery business. He had what I would call a mammoth incubator. I guess that is the best description I can think of

for it. It was in a sort of a back yard, back of the Hinton Theatre and also sort of back of some small buildings or shacks that Judge Lieber had, in one of which he had a movie theatre; and I describe it that way because the Hinton Theatre is on a corner, and from North 3rd Street it would be back of the Hinton Theatre Building; from the other street it would be back of Judge Lieber's shacks and to the side of the Hinton Theatre Building. It was right in the business section of the city, well, within two blocks of where the residence portion began but it was down in the business section of the city, very close and very handy to the city. I visited that incubator and saw it myself. I kept a kind of data or memoranda or other documentary evidence relating to my life in Muskogee, Oklahoma. It consisted of various records and copies of clippings and articles, photographs that were pertinent to my work and which at the time I left Muskogee I was enough interested in to [fol. 833] bundle up and retain and save. I am now handed an album or scrap book marked on the outer cover "Photographs" which has likewise been marked for identification in this case as Defendants' Exhibit No. 26. This is the book—I can tell you from the outside, a brief glance—in which I gathered together and personally glued in such of the photographs and other interesting items and clippings covering my Muskogee life or activity that I was especially anxious to save because of their sentimental interest, shall we say, and which album was produced by me and put together by me. This album was all made on one day. It was made by me after I moved into my home in Evanston, about thirteen years ago. As to the source from which I obtained the various items that appear in the album, I took my old dusty bundle that I still had marked "Muskogee" and opened it up and went through it and selected from the mass of material that I had these particular items because they were of particular interest to me. That book, marked for identification Defendants' Exhibit 26, has been in my possession ever since, excepting briefly for a few days recently. I gave it to Mr. Gillard—I loaned it to Mr. Gillard, I should say. He is an official of the James Manufacturing Company. It is not in the same condition that it was in when I gave it to Mr. Gillard. On the first page there has been a carbon copy of a typewritten article attached to the place that was originally blank. On that same page are two

red stickers, or red-bordered stickers, I should say, that were not there. Back in the Hastings Hatchery section [fol. 834] there is one page that has evidently been taken out and put back upside down. But all the pages are here as I know them because I have looked through the album often, and there is nothing that has been inserted that is not mine. I should have said that my pages were not numbered. I see that someone has numbered them. The pages have been numbered consecutively. Otherwise there is not the slightest difference in the album or the scrap book from the condition it was in when I turned it over to Mr. Gillard. And with respect to the typewritten article appearing on page 1, that is a carbon copy of the publicity article that I wrote in Muskogee and which I saved for my own record. I gave it to Mr. Gillard but I gave it to him loose; it was loose. At the same time that I gave him the album. And I obtained that from the same source that the other items came from. I went back to my old bundle and opened it up and found it near the top.

(The defendants then offered in evidence the scrap book or album and its entire contents, previously marked for identification Defendants' Exhibit 26 as Defendants' Exhibit 26.)

(The album in question was marked "Defendants' Exhibit 26, George W. Johnson," the custody of which is covered by the stipulation at the end of this deposition.)

The witness then resumed under direct examination by Mr. Greer:

I am asked to turn to page 1 of that album and tell who [fol. 835] prepared that typewritten article that appears on that page 1. I did. My purpose in preparing that was for publicity purposes. It was prepared, well, either right at the last of 1911 or the very early days of 1912. It was prepared in seven or eight copies and each one of the copies with the exception of this copy of it was sent to different electrical publications with a set of photographs, in the usual manner that we always sent out releases for publicity in Muskogee. The activity of an incubator was quite unusual, and one of my duties in my position at Muskogee that I was charged with by the Byllesby people was to see that Muskogee and our company received as much publicity as

possible. To do this we naturally selected the unusual uses for electricity and gas and made photographs of them, wrote up stories and sent them out to the various electrical trade papers and in that way received considerable publicity for Muskogee. To my knowledge there was no other hatchery comparable in size and capacity in Muskogee, Oklahoma, with that of Mr. Hastings' that I have referred to, at that time. I am asked to turn to that article that is attached to page 1 of that album, Defendants' Exhibit 26, and look at the second paragraph on the first page. My attention is called to the fact that it refers there to "Figures 5 and 7 show how these chambers are constructed and how these trays are set in." What I meant when I referred to as "Figures 5 and 7" was two of the photographs that were sent out with the article. I believe that one of those photographs appears in this album, possibly both. There is no photograph of Figure 7 here but the photograph that I am marking with pen "Figure 5" is what I referred to. I will [fol. 836] mark it right here on the right edge. Just mark it "Figure 5".

(The photograph in question was marked "Figure 5. N. B. H." by the witness.)

A commercial photographer in Muskogee by the name of Greene took this photograph that I have marked Figure 5. He took it for me. I requested him to take it, and I was present when it was taken and showed him where to point his camera. It was taken the early part of 1912, is as close as I could come as to when it was taken. Now I am asked to look again at page 1 of this typewritten article which appears on page 1 of the album, Defendants' Exhibit 26, where the following sentence occurs: "The amount of moisture in the air is governed by the moisture introduced at the fan as is shown in Figure 2," and asked to point out in the album what I referred to as Figure 2 there. The picture is here. It is a picture of the fan. The page that is upside down that has been numbered—I can't read it. I can mark the photograph. I have marked the photograph "Figure 2".

(The photograph in question was marked "Figure 2, N. B. H." by the witness.)

The same photographer, Mr. Greene, took that photograph at the same time as the other, under the same circumstances. They were all taken that way. Now, turning over to page 2 of the typewritten article, in the first line the following sentence occurs: "Upon entering the hatchery we [fol. 837] are first taken into a small anteroom, as shown in Figure 1." The photograph is here in that album which was referred to as "Figure 1". That photograph is on the page numbered 82 in the album. I mark that photograph "Figure 1" also.

(The photograph was marked "Figure 1, N. B. H." by the witness.)

In this typewritten article on page 1 of Defendants' Exhibit 26 and referring to a thermostatic arrangement the article states as follows: "This thermostat is set to operate at a designed temperature so as to close off the gas when the room becomes too hot. There are two other such arrangements on the same line, one of which is shown on Figure 6." Figure 6 appears in the album also, on page 82, and I am marking it "Figure 6".

(The photograph was marked "Figure 6, N. B. H." by the witness.)

Further on in this article which appears on page 1 of Defendants' Exhibit 26, in the paragraph next to the last on page 2 thereof, the following occurs: "The attendant will be seen in Figure 3 pulling out trays of eggs for turning, which is done three times a day by hand." I indicate what there is in the album that was referred to as this Figure 3; it is on the page that the numbering is not clear, the same page that Figure 2 appears on, the page that is upside down.

(The photograph in question was marked "Figure 3, N. B. H." by the witness.)

[fol. 838] I do not recall the various publications to which I sent this article—not exactly—but some of them are not in existence today. I can give you the name of the McGraw-Hill Company that published several electrical papers, to which editor we always sent all of this type of material. We also sent it to a publication that was formerly issued in Chicago called "The Electric City", the editor of which

paper got all of my material too. It was also sent to a publication then in existence called "The Western Electrician", a paper in which a man named Ainslie A. Gray was interested and one of the editors of which was Howard Ehrlich, that paper not now being in existence. It was also sent to the editor of "Popular Electricity", which editor received all of our articles of this kind; and two or three others that I can't remember. In sending this article I also accompanied the article with these photographs, copies of which I have marked. That was our custom in all cases. Turning to page 81 of the album marked Defendants' Exhibit 26; that page carries a cartoon that was published in the Muskogee Times-Democrat and a single column article six or seven inches in length that appeared on the same page. As to when that article appeared; I had the entire newspaper in my bundle and I clipped out these articles when I made up my scrap book and saved the heading which reads: "February 29, 1912". That article uses in the second line in the second paragraph the following language: "She, or he, was hatched under electric light in the New Hastings' 30,000 egg hatchery on 3rd Street, just north of the Hinton Theatre." The Hast- [fol. 839] ings' hatchery that article refers to is the same one we have been talking about. The one in Muskogee. Turning to page 82 of the album which has been introduced in evidence as Defendants' Exhibit No. 26, those photographs appearing thereon represent views in the hatchery that was started by Mr. Hastings and we have already described them in our testimony as photographs 1 to 6. The photograph that appears there is one of Mr. Hastings. The elements or parts that are shown in the opposite photograph, the one opposite to the one that shows Mr. Hastings in Figure 6, the pipe coming down is the gas supply. The batteries there are used to actuate a home-made valve, float valve and to the right there are two long bars that were made of zinc and in the ends of these bars, opposite to the end from which they were supported, there is a contact point arranged and a little cup of mercury. When the temperature became too high these zinc bars softened a little bit and allowed the contact to be closed there and actuated the gas valve to turn off the heat. I can state that that device was actually installed in the Hastings incubator at Muskogee in 1912. I saw it there, examined it and had this

picture taken of it because I thought it was so interesting. Turning to page 83 of the album, Defendants' Exhibit 26; this page has an article that was clipped from The Electrical World, and a photograph of a man's hand holding a chicken. The editor of The Electrical World unquestionably took my publicity material with the pictures and made this article from what I had sent him. It does, I believe, quote certain sections of my typewritten article and some of it appears to have been rewritten. That article appears to be dated [fol. 840] July 6, 1912, and I am satisfied it appeared in the July 6, 1912, issue of The Electrical World. Now, looking at the photograph or illustration marked "Fig. 2" in that article; it shows the fan that moved the air through the incubator and the pan of water underneath it that was used to introduce moisture. It shows in the extreme left, a part of a tray of dry batteries. On the extreme right it shows another one of those long zinc bar thermostats in it. It only shows part of it. When I say "in it", I mean by that the picture. This picture was taken in Mr. Hastings' incubator in Muskogee, and shows how the fan was set. I can't give a verbal description of it from memory, only from looking at the picture. Looking at the picture to refresh his memory, the witness said: The fan was set to push the air through some section of the incubator here that is not shown in the picture. And I can tell you this, that the camera, when that picture was taken, was set down near the floor in a doorway from which we had to remove the door or open the door to look in here. This was an inside part of the machine. In other words, when you entered the incubator, the fan was not visible unless you looked inside this door. If you will look at the picture Figure 1, below Mr. Hastings' waistline there, and behind his legs, is that compartment with the door closed. It is visible in the picture. We simply turned the button and opened that door and put the camera down there and took this picture that showed the fan. We had to have a photographer's light to do it; it was all dark in there. Otherwise I think that the picture shows exactly how it was placed. It shows the wires feeding the fan. I am asked to look at the wall that is shown in that photo- [fol. 841] graph of the fan installation, the wall that is on the right hand side of the photograph as you face it, and state whether or not that wall was on an oblique or at right angles with the wall to which the fan was attached. The

picture shows that it is on a slight oblique. It is very evident to me. That is my recollection of how that installation was in the Muskogee Hastings' incubator. I might—it comes to my mind here—I might elaborate a little further by saying, if you will refer back to Figure 1, that to the right of the door that is closed of that same compartment there is also a piece of wall at an oblique, I think in the same relative relation of this other wall that is in Figure 2 at an angle. The photograph on the left of page 84 is marked Figure 2 and is the same as the photograph or cut appearing of the same photograph marked Figure 2 in the article in The Electrical World. It represents the same thing only it is larger and shows a little more clearly even what is shown in the other one. The photograph to the right of page 84 was marked Figure 3 by me in the testimony and shows Mr. Hastings either removing or placing a tray of eggs in one of the compartments of the incubator. Those photographs were taken by Mr. Greene also and at the same time. The photographs were all taken on one trip. Turning to page 85 of Defendants' Exhibit 26; that is an article about the incubator from Popular Electricity magazine which I clipped out of the magazine at the time I made this scrap book. It has an ink notation on it "November, 1912". I put that writing on there. I wrote it on that page at the time I clipped it out of the magazine just as a matter of [fol. 842] record as to the magazine I took it out of. My article, then, appeared in the November, 1912, issue of Popular Electricity magazine. That was part of the results of my publicity. I furnished the information there. I did not think there was any doubt about it. It is from the pictures that I sent into that place and from the information I sent into it. The photograph on the left of page 86 shows practically every tray in the entire incubator partially or almost entirely pulled out from place with the doors that covered them when the incubator was running—I refer to the Hastings' incubator in Muskogee—having been removed. And I particularly remember this picture because I wanted a picture like that and Mr. Hastings protested very vigorously against exposing so many eggs even long enough to take a picture of them but he finally gave in and let us have it. On the right is the photograph I have previously referred to as Figure 5, which shows one of the compartments of the incubator partially filled up with drawers of eggs. The

turning to page 87 of Defendants' Exhibit 26, which I notice is a newspaper article entitled "Largest Chicken Hatchery in the World in Muskogee". I don't know what paper that appeared in, and when. I don't know exactly. It appeared in one of the Muskogee papers, of which there were two, and it appeared at about the time that this incubator was getting a great deal of attention there, and I believe from the type and make-up and from the fact that I was more friendly with the Times-Democrat people than I was with the Journal that it was in the Times-Democrat. It was [fol. 843] one of the items in connection with my life in Muskogee that I saved. Turning to page 88 of Defendants' Exhibit 26; the photograph on the left is another picture of Mr. Hastings taking out some hatched chickens and broken egg shells from one of the compartments in his incubator in Muskogee. The photograph on the right is a view looking into one of the compartments, showing the chickens hatching or in the process of hatching out; and that photograph also shows the manner in which it was taken by the reflection of the photographer's light on the back wall. It was quite dark and we had a spotlight that we used there to take those pictures. Turning over to the other side of the page, marked page 89 is an article that appeared at about that same time in one of the newspapers in Springfield, Illinois. That article refers to "Muskogee, Oklahoma" and treats or tells of hatching eggs by electricity. It also uses the language, "She, or he, was hatched under electric light in the new Hastings' 30,000 egg hatchery on 3rd Street, just north of the Hinton Theatre". It refers to the large incubator or hatchery that Mr. Hastings had at Muskogee and which we have been referring to in this testimony. Now, then, turning to page 90 of Defendants' Exhibit 26; those are photographs of some hatched baby chicks from the Hastings' Muskogee incubator. The one on the left being simply a publicity photograph of a freak chicken that just had its head out on one side and a large hatched chick on the other side; and the photograph on the right showing probably a couple of hundred baby chicks. They all were taken at the Hastings' incubator at Muskogee; they all came right from the same place and the photographs were all [fol. 844] taken at the same time. I probably visited the Hastings' incubator five or six times. Muskogee was a very

active, growing city, people were coming in all the time, establishing their homes, establishing businesses. And so far as the Hastings' business was concerned, to my recollection every time I was ever there there was business being done. People were either bringing eggs to be hatched or were taking away baby chicks, as I recollect it, from their own eggs or were purchasing baby chicks that were being sold there as freshly hatched.

Q. It was operated there then on a commercial basis?

Mr. Ely: I object to that as leading and also calling for a conclusion.

A. In my opinion it was a going business.

Q. I will ask you whether or not during your life at Muskogee, Oklahoma, you ever heard any adverse criticism of this incubator either with respect to its being a practical operative device or failure while you were there in Muskogee?

Mr. Ely: I object to that as calling for hearsay.

Mr. Greer: I would like to place on the record that the purpose and object of this question is in response to the attack of counsel for plaintiff upon Mr. Hastings at the examination of Mr. Hastings in New York recently.

Mr. Ely: I call attention to the fact that Mr. Hastings' testimony speaks for itself as to what happened in the hatchery.

[fol. 845] Mr. Greer: I will ask the reporter to read the question to the witness.

Mr. Ely: I renew the objection to the question.

(Question read to the witness.)

A. No, I did not.

Q. Did you ever hear any rumor or report or talk of Mr. Hastings skipping town?

A. I did not.

Mr. Ely: I object to that as calling for hearsay.

I knew a Mr. John G. Lieber of Muskogee, Oklahoma. Mr. Lieber had several enterprises of various sorts during the years I was in Muskogee. He was the owner of a string of movie houses; he ran the local legal paper that published the legal decisions and suits and so forth; he had consider-

able property that he was interested in, and he was quite a factor in the growth of Muskogee in certain directions. Because of that and because the judge knew people that were newcomers coming into town I had frequent contact with him during the time I was there. We were fairly friendly. Because of my activities in being in touch with vacant stores and people moving in and moving out that the judge was interested in he liked to see me because I was able to give him information and I liked to see him because he was able to give me information. And I probably sat down with the judge in his office once a week or oftener and talked to him when I would be going by the place. I cannot remember that Judge Lieber ever said anything about the hatchery [fol. 846] to me one way or the other. I first learned that the defendants in this case were desirous of taking my testimony about a month ago. Since that time a representative or agent of the plaintiff, Samuel B. Smith, called on me, a Mr. Taggart. A week ago, Thursday, that would be the 2nd of November, I was in Cleveland. I was just about to leave town; I was just closing my grip in the hotel, and the bell rang and Mr. Taggart introduced himself over the wire and asked me if I was Norman B. Hickox of Curtis Lighting. I said I was. He asked me if I was Hickox that had been in Muskogee. I said that I was. He asked me if I could give him a little time. I said I would be glad to but I was getting out of town and was catching the train in a little while. He came up to my room, introduced himself again. I asked him, I believe, over the telephone, how he had found me and he stated that his associates had made contact with my office in Chicago and had been told here that I was in Cleveland that day. Mr. Taggart identified himself as being connected with the other side of the case and said he wanted to meet me and talk things over with me and find out how I was going to testify. We had a very nice little visit there together. I had the impression first that Mr. Taggart, from what he said, had been to Muskogee and was attempting to check up a little on me to see if I had been to Muskogee, if I knew anything about Muskogee, which is perfectly natural. I would have done the same thing. I also had the impression that Mr. Taggart was making statements about certain things in an attempt to draw me out, which was all right; I [fol. 847] think I would have done the same thing. We talked over the general facts of the case; did not go into any great

detail as I recollect it. And Mr. Taggart told me of his visit to Muskogee and told me about Judge Lieber, where he was, what he was doing down there now, which was something I did not know. I think that is about all that happened. I left Muskogee, Oklahoma, in August, 1912. From there I went to Knoxville, Tennessee, as manager for the Greenwood Advertising Company, There is something in the album, Defendants' Exhibit 26, referring to my leaving Muskogee, in the last pages. On page 99, there is a letter from my direct superior of H. H. Byllesby & Company. It was received by me in the ordinary course of business and I saved it because it was a letter expressing the fact that Byllesby wanted to promote me if I was going to stay with them. On the next page, which is page 100, there is a clipping from the Byllesby Weekly News Bulletin, which came out to all of us, mentioning the fact that I was to leave. On the last page, page 101, there are several clippings from several publications, from Springfield and other places, speaking of my services at Muskogee and where I was going.

Cross-examination.

By Mr. Ely:

I turned over this album, Exhibit 26, to Mr. Gillard the second time that I saw him, about a month ago. I did not keep a record of the date. Some time during the month of October, the early part of October, approximately. I have correspondence with Mr. Gillard that I can refer to and give you the exact date. I have not got it here, it is in my [fol. 848] office. I did not bring it. I would say it was before the middle of October; about a month ago. I can call up my office and tell you the date that I turned this album over to Mr. Gillard. Referring to this article in the album —Figure 4 shows the attendant removing hatched chickens from one of the hatching trays. It is the left hand picture on page 88, which I will mark Figure 4, if you want me to.

(Photograph marked "Figure 4, N. B. H." by the witness.)

There are in this album, ten photographs which relate to the subject-matter concerning which I have testified. All of these photographs were taken by Mr. Greene. They were all taken at my request and under my direction. We were

there together. They were all taken at one time—well, not exactly—but they were taken consecutively, one after the other; they were all taken on one day, within a couple of hours, I mean. I cannot state what day that was—I don't know. It was either the latter part of the year 1911 or the early part of the year 1912, very soon after the 1st of January, 1912, if it was in that year. Well, I don't know that I could fix it that closely by saying it would certainly not have been later than the last of January, 1912, but generally, yes, because these pictures were all taken before this matter appeared, which appeared in February. I am referring in that case to the matter appearing on page 81. At the time these photographs were taken I don't know whether the incubator was full, but the condition that it was in is shown by the left-hand picture on page 86. That is, it had at least [fol. 849] as many eggs in it as is shown in this left-hand picture on page 86. They are shown there in the picture. I mark that picture in some way so that you will know just which one we are talking about. I'll just mark that picture "A" and put my initials on it down in this corner.

(The photograph in question was marked "A", "N. B. H." by the witness.)

I can now give you the date I turned the album over to the James Manufacturing Company. October 23rd was the date that I turned this album over. Now, if you want the date that I first met Mr. Gillard I can establish it from that. That was October 23rd—October 23rd I believe was on a Monday. Have you got a calendar here so that I can look at it? That is all right, but I have got to fix it by the days of the week. I first met Mr. Gillard the second Friday before that. In other words, about ten or eleven days before that. Now, let's see, the 23rd was on Monday, the Friday before that would be the 20th. The 13th of October. That is right; it was Friday, the 13th. Now, I remember. That is the day I first talked to Mr. Gillard. Referring to this photograph which is marked "Figure 1", the fan as I understand it, is set in a low closet or cupboard on the floor; that is right. And I got at that fan through this little door which appears back of Mr. Hastings. That is correct. As to whether that was a solid door, I don't know—other than what the picture shows. Looking at the picture, it appears to be a solid door. Well, you can make

up your mind as well as I can make up mine. It appears [fol. 850] to be a solid door. I can't remember definitely with a detail of that kind. After these pictures were taken I visited this incubator—oh, probably four or five times. I was the contract agent or commercial manager, of the Muskogee Gas & Electric Company. My duties were to secure the signed order for connection for gas and electric service from commercial customers and to see to it—to give what might be called a general inspection of their premises and to estimate how much service they might need and use and if they did not have any wires connected ahead of the meter, and so forth. I never saw any other fan used in connection with this incubator than the one shown in Figure 2. As to what period I visited this incubator, well, to the best of my recollection, it must have been during the time that he was hatching there, after he was in operation. I can't just say how far apart or how close together my visits were. I was interested in the thing because of its novelty and when I went by that way I stopped in. I went there several times during that period; I would say about a half a dozen times altogether, during the entire time. I am told Mr. Hastings testified day before yesterday that he left there in May, some time in May. I would not have any way of knowing whether I went there then. I had no connection with this enterprise at all; none whatever, except my interest in it for its use of gas and electricity. No one would have had any object in kicking to me if the incubator had not worked properly. I might embellish that a little bit, that answer, if you would like me to. I will say this, that according to our [fol. 851] custom with any customer if anything would have happened to this enterprise so that it would have gone out of existence leaving any unpaid light or gas bill that I would have heard about it.

Redirect examination.

By Mr. Greer:

Q. Mr. Hickox, after these photographs that you have identified were taken did you ever visit that incubator with any view of checking any installation there or anything of that kind?

A. The visits I made to this incubator after the photographs were taken were perfunctory visits, the same as I made on hundreds of customers.

Deposition of A. D. Peabody

A. D. Peabody, being called as a witness by the defendants, after being first duly sworn according to law, testified as follows by deposition which deposition was offered and admitted in evidence.

Direct examination.

By Mr. Rowan A. Greer:

My name is A. D. Peabody. I am 45 years old. I reside at 433 Foote Avenue, Webster Groves, Missouri. My present business occupation is Western district merchandising manager for Westinghouse. I have been with Westinghouse for a little over six years. I lived in Muskogee, Oklahoma, from March, 1910, until December, 1925. My business or occupation while I was living in Muskogee, [fol. 852] Oklahoma, was as electrical contractor and dealer from 1910 to 1921 and wholesale electrical jobber from 1921 to 1925. I know Mr. Norman B. Hickox of Chicago, who is now in the room where my deposition is being taken, both well and favorably. I met him in the Spring of 1910 at Muskogee, Oklahoma. He was living there at that time and he was commercial manager or contract agent for the Muskogee Gas & Electric Company. I know a Mr. Milo Hastings. I met Mr. Hastings in the Fall of 1911, late Summer or early Fall, in Muskogee, Oklahoma, at my place of business. I know what business or occupation Mr. Hastings was engaged in at that time. He was installing a commercial hatchery for and with Judge Lieber, as I understand it. I had something to do with the installation of the hatchery of Mr. Hastings in Muskogee, Oklahoma. We installed the ventilating equipment for him and did the electric wiring. I can tell you what means were provided in the hatchery there for ventilating purposes. The idea was, of course, to supply a mechanical means of putting warm, fresh air through these egg compartments at the proper temperature in this commercial hatchery. The first installation we made was a propeller type ventilating fan. My attention is called to a photograph appearing on page 34 of the album which has been introduced in evidence in this case as Defendants' Exhibit No. 26, this photograph being marked "Figure 2" with the initials "N. B. H." on it.

That is the ventilating fan that we installed in this commercial hatchery for Mr. Hastings. It was made by the Emerson Electric & Manufacturing Company of St. Louis. Installation was made, approximately, in the Winter, Fall [fol. 853] and Winter of 1911 and 1912. I can't designate the exact day or week or month, but within a period there of three or four months. Well, this fan is like many others that we bought from the Emerson Electric & Manufacturing Company through the Commercial Electric Supply Company in St. Louis, and the normal speed in such installation is 1150 R. P. M. I know that a change was made in the installation in connection with the ventilating or circulation of air in that incubator. Well, this propeller type fan was found not to exert sufficient pressure to force the air in sufficient quantity down through these egg racks and we changed this to what is called a sirocco blower. Well, as I said, this installation was made in the early Fall or Winter of 1911, and this change was made as I recall it—I could not fix the exact date, but within six to eight weeks after the original installation was started up. I personally had something to do with the installation of the ventilating means in that incubator. I had supervision of it. I had mechanics working for me that did the actual work but I had supervision of it. I saw the incubator itself in operation.

Q. I now hand you a set of drawings consisting of two pages, marked Defendants' Exhibits 22 and 22-A, in this case, and will ask you to look at those drawings and tell if those drawings correctly represent the installation of the incubator in the Hastings hatchery at Muskogee.

Mr. Ely: I object to the question. The proper way to examine this witness on that point was to get his recollection first before showing him the drawings.

[fol. 854] The Witness said: This represents the general scheme that was employed in supplying warm, fresh air for this incubator. However, this diagram showing the thermostat here is not the one that I saw. The one I saw was more or less of a home-made affair that Mr. Hastings had rigged up himself. This looks like a more finished product than the one he had, but the general circulation of air and the general scheme of warming this air and introducing it through these racks is as was used in that incubator. I am asked to look at page 82 of Defendants' Exhibit No. 26 and

tell what the photographs shown there represent. This is the installation that I saw there. This is the rather crude-looking switch and thermostat device marked "Figure 6, N. B. H.". I know that incubator was actually used and placed in operation. Yes, sir; it was. I did not hear any criticism either of Mr. Hastings personally or the operation of that incubator.

(Objected to as hearsay.)

The only comment that I ever heard about the installation was that it was satisfactory. I never heard any criticism as to Mr. Hastings or his character. I first learned that my testimony was desired in this case yesterday afternoon. I was requested to come to Chicago to give my testimony then—by long distance phone, by yourself.

(Referring to Mr. Greer of counsel for the defendants.)

I could not tell you anything at all of the revolutions per minute of the motor operating the blower which I have re-[fol. 855] ferred to, because I do not have the same information that I have on this propeller type fan because it was a bolted-up outfit that was used for this purpose and it would all depend on the size of pulleys used on the motor and on the blower. It might be anything from 600 to 1800 revolutions per minute. That blower was not furnished to Mr. Hastings by me or my company. It was a blower that we had furnished to Judge Lieber some time previous and adapted to this purpose. We installed it.

Cross-examination.

By Mr. Ely:

When this blower-fan was installed in the incubator it was put in the place of the other type of fan, the earlier type of fan. That is right. It was substituted therefor. I had no interest in the hatchery, no business interest; none whatsoever; just a customer of mine, so that if there were any kicks or any complaints they would not have come to me with them, not unless they pertained to the operation of the electrical equipment. But whether it hatched eggs or not, that would be something that would not come to me. That would be out of my province.

Redirect examination.

By Mr. Greer:

I was asked on cross-examination as to the substitution of the blower for the fan in this incubator. The location was approximately the same. As for the exact status in inches, that I could not give you but it was in that same general location that the blower fan was installed, in a [fol. 856] room there at the end of the egg racks. I do not know whether there was any change in the direction in which the fan was pointed or in the direction in which the blower was pointed. And that does not make any difference because a positive type blower will carry, has sufficient pressure to carry the air to where you want it.

Deposition of JOHN G. LIEBER

JOHN G. LIEBER, a witness called on behalf of the defendants was first duly sworn, according to law, and testified by deposition at Muskogee, Oklahoma, Feb. 26, 1934, as follows, which deposition was offered and admitted in evidence:

Direct examination.

By Captain Greer:

My name is John G. Lieber; my age, sixty-one; residence, 1211 Locust Street, Muskogee: and occupation, Druggist. I have been living in Muskogee, Oklahoma, thirty-nine years.

I know a Mr. Milo Hastings. He came to me in 1911, I think along in the fall, and said the Commercial Club here had sent him to me. At that time I was practicing law and operating some other business affair here in Muskogee. At that time he told me about his idea about a hatchery, "Mammoth Hatchery", as he called it, and he needed someone to finance it. He went somewhat into detail about his idea of a Mammoth Hatchery; it looked pretty good to me; [fol. 857] I had a little money in those days and wasn't afraid to take a shot with something that looked all right, so I agreed to back him for $1,000.00 and furnish him a place for his hatchery; that is, for the hatching of the eggs, and

office place, for him to receive the customers, etc. That was in the fall of 1911.

We made an agreement and formed a Corporation known as the "Hastings Hatchery," the Corporation consisting of Milo Hastings—I think he was Vice President, and Eddie Hastain, who was Secretary and Treasurer, and myself. Hastings went right to work to building the hatchery, which was built on the back end of a lot that is next to the Ritz Theatre now. The number was 306 and 308 Court Street. The hatchery was actually built. I had the place already for him to work in; in fact, I had the buildings. It was a one-story brick building approximately twenty (20) feet square. That was the building in which the incubator was installed, and office building or workshop or whatever you might call it. That was a building twenty-five (25) by fifty (50) feet, twenty-five (25) by seventy-five (75). It was completed sometime that winter just before the hatching season ordinarily starts. I imagine about January.

I can give you a description of that incubator. The incubator was 30,000 egg capacity; there were seven (7) compartments and each held 5,000 eggs; those compartments had trays that fit in there, I think about 20 trays, and each tray held 500 eggs. I think that was the way of it. I said there were seven (7) compartments. Well, now, the sev- [fol. 858] enth compartment, I might state right here, was not necessarily for hatching but to take the chickens off when they had been hatched. They were arranged side and side, one just beside the other, all in one big enclosure of course, and there was a place in the bottom of each compartment where the air could go out, and place in the top of each compartment where the air could come in, and the intake or top of the compartment had a valve you would call it, just a slide so he could regulate the amount of air that went in there. He could enclose it off entirely if he wanted to, or open it wide open, so that he could regulate the amount of heat he had in each compartment.

For the heating of the air he had an arrangement of pipes, that is, just ordinary stove pipes, in the south end of the hatchery itself, and those stove pipes were connected with a gas heater, gas burner, to furnish the heat. That burner was equipped with a "thermostat" I guess you would call it, to regulate the heat.

Now, the arrangement for the circulation of the air. At first he had—to circulate the air, he used an ordinary ex-

haust fan that we had used in one of our picture shows. After about two or three days after he first started the hatchery, that is, the hatching of eggs, he found that the exhaust fan wouldn't furnish the force to the air that he needed, and we then ordered a blower from up north somewhere; I don't recall the name of the firm; ordered it by telegraph and had it sent by express, because Hastings realized that he had to change it right there or lose what eggs he had in the incubator.

(Objections to testimony as to what Hastings thought.)

[fol. 859] With regard to the fan which was initially installed in the incubator, the air space between the compartment that held the eggs and the east line of the incubator was about eight (8) inches I would say. This fan was twelve (12) inches or more in diameter, and he necessarily had to set the fan at an angle in order to make it fit in like it should.

I am handed a drawing, "Defendants' Exhibit No. 22," and asked to look at that drawing and tell what it is, or what it represents.

(Whereupon, witness examines "Defendants' Exhibit 22").

That is about as near a drawing of the incubator as it was set up as you could get without taking an actual photograph. Of course the—it may not run true as to size, etc., or inch or quarter-inch, or whatever you might call it, or as to scale, but that is approximately like it was set up after the blower was set up. That blower corresponds approximately with the arrangement of the incubator as near as I recall it.

My attention is called to a line drawn from approximately the center of the drawing with the letter "E" at the end of it. That represents a compartment of the incubator. That is the compartment which I referred to as containing twenty (20) trays. The little nobs that has the ink line with the letter "P" at the end of it, that represents, as I recollect it, a "latch" you would call it, to hold the door in place that held those—made the thing air-tight. Now, the space on the drawing that has the ink line with the letter "R" on it, that is the "valve" you would call it, or [fol. 860] "regulator" to regulate the amount of air that was let into a compartment. On the top of each compart-

ment there. With that slide arrangement so that that hole in the top could be closed or opened as you wished—just according to the amount of air that he wanted in each compartment.

That incubator did not occupy the entire space of the building. It occupied approximately one-half of one side, or one-half of the building, you might say. And I stated that the capacity of that incubator was approximately 30,000 eggs.

I am asked to look at an issue of the Popular Mechanics Magazine, "Defendants' Exhibit No. 24," and state what the picture appearing on page 630 of the Popular Mechanics represents. That represents Milo Hastings taking chickens out of a compartment of the incubator and placing them in shipping boxes. That is the incubator that I have referred to here in Muskogee.

As to the arrangement in connection with this incubator for furnishing moisture to the air that was circulated in the incubator: He had a—I guess you would call it, a deep pan and a narrow pan of water, right at the end of the blower so that the air that went into the blower would have to pass over the pan of water.

I am asked to look at an issue of July 6, 1912, of the Electrical World, page 55, "Defendants' Exhibit No. 25," and shows two illustrations marked "fig. 1" and "fig. 2," and state what those are, if I can. "Fig. 1" represents Mr. Hastings in that hatchery candling eggs, and Figure "2" represents the original exhaust fan that he put in the hatchery, with the moisture pan shown just under the ex- [fol. 861] haust fan. That is the fan that was initially put in the incubator. That fan was later substituted by a blower. That photograph, "fig. 2," correctly represents the installation of that fan as it was originally put in this incubator.

I am asked to look at a photograph, "Defendants' Exhibit 26-C." There are two views in this Exhibit and I am asked to look at this and tell what they are, if I can do so.

(Whereupon, witness examines "Defendants' Exhibit 26-C").

They are both numbered "26-C." The one on the right-hand side shows the exhaust fan that was in the blower as it was actually installed. Left-hand shows—the one on the

left-hand side shows Milo Hastings in that incubator in the act of turning the eggs in a tray.

I am asked to look at a photograph, "Defendants' Exhibit No. 26-D." That is this one (indicating), and to state, if I can, what that represents.

(Whereupon, witness examines "Defendants' Exhibit 26-D").

The top part of the photograph represents trays of eggs pulled partly out of the different compartments—of the Hastings Incubator here in Muskogee. And one tray on the side there—two trays, rather, on some brackets that he had on the side of the wall to put these trays on, or to put anything on he wanted to, for that matter. The lower portion of that picture, "Defendants' Exhibit 26-D," shows trays [fol. 862] of eggs inside of the compartment of that hatchery. I can state that that incubator was in actual operation during the hatching season of 1912 and 1913. Mr. Milo Hastings stayed here in Muskogee, until the latter part of the summer, I think it was, of 1912, and then left.

I know that while Mr. Hastings was here in Muskogee the incubator was operated at full capacity. The result of that operation of that incubator as far as I know was that it hatched thousands of eggs into chicks.

The—now, I could tell you about why he hatched with the eggs as he did that first year. Probably you don't want that in, though. However, that year he had intended to hatch eggs like they do today in the big incubators.

(Objected to as testifying to what Hastings intended to do.)

I was interested in this incubator as a financial venture myself. A few eggs were received to be hatched in this incubator upon a commercial basis, but most of them were what we call today "Custom Hatching". I mean by "custom hatching" where people will bring a setting of eggs, or case of eggs, to the hatchery, and have them hatched themselves. He devised a means of raising some money quick because he had used twice as much as I had agreed to furnish him, and instead of doing "Commercial Hatching" as they do today, he advised that he would do "Custom Hatching". A charge was made for that. I don't recall the amount, but I know it took a lot of bookkeeping. I do not

have any of the records of that bookkeeping or business [fol. 863] transactions now. I suppose they were destroyed when we tore the incubator up.

I am asked if I have any knowledge of what percentage of eggs hatched that were placed in that incubator. I recall, I was living out on a farm at that time, north of town, and we were hatching eggs with hens and had been for some years before. This incubator, they were hatching the usual percentage of hatches during that year. That was the year of 1912. My recollection is that it ran from nothing in some cases to as high as 75 and 80% in other cases.

The venture was not a financial success. In other words, I did not make money out of my investment in that incubator. No, I lost it all. After Mr. Hastings left Muskogee in the summer of 1912, we left it just as he had built it and Mr. Hastain who was a member of the Corporation, and knew more about the operation of the hatchery than anybody else outside of Milo Hastings, had his brother-in-law, a Mr. Dierfield, put some money in the business the next spring, and he and Mr. Dierfield operated it during the season of 1913. I say they operated it. I mean by that, they hatched eggs in it. Then, after the season of 1913, we tore it all apart and moved it out to my farm and Mr. Hastain's farm, which was just beside my farm. It was never operated again after the season of 1913 after moving it out to my farm. As to what has become of it, most of the lumber was used in other buildings and things, and the trays were out at Mr. Hastain's farm for quite a while. Now there is nothing left of it that I know of but the blower. That is the blower that was substituted for the [fol. 864] fan originally. That blower is still in existence. It is out on Mr. Hastain's farm. I have had photographs taken of that blower lately.

I am handed a photograph and asked to state what that photograph represents.

(Whereupon, witness examines "Defendants' Exhibit 22-B".)

(Objection by plaintiff as the blower is in existence and the photographs are secondary evidence.)

This photograph shows the Air Intake side of the Blower. That is, of the Blower that was installed in that incubator. I had that photograph made.

Captain Greer: The defendant now offers in evidence the photograph identified by the witness, as "Defendants' Exhibit 22-B".

Mr. Ely: I object to the receipt of the photograph as secondary evidence. The blower should be produced if in existence now. I also object to the photograph on the additional ground that it only shows a part of the device.

The witness resumed under direct examination by Mr. Greer:

I am handed another photograph and asked to state what that photograph represents.

Mr. Ely: I repeat my objection in regard to secondary evidence.

[fol. 865] (Whereupon, witness examines "Defendants' Exhibit 22-C".)

That represents the back end of the blower. I had that photograph taken.

Captain Greer: The defendant now offers the photograph identified by the witness in evidence as "Defendants' Exhibit 22-C".

Mr. Ely: I make the same objection, and move that all the testimony be stricken out with regard to these photographs.

Q. I now hand you another photograph, Mr. Lieber, and ask you to state what that photograph represents.

Mr. Ely: Same objection.

(Whereupon, witness examines "Defendants' Exhibit 22-D".)

A. That represents the side of the blower containing the pulley.

Q. Did you have that photograph made?

A. Yes, sir.

Captain Greer: The defendant now offers in evidence the photograph identified by the witness as "Defendants' Exhibit 22-D".

Mr. Ely: Same objection. May I ask counsel for the defendant if they are going to produce the original blower?

[fol. 866] Captain Greer: I will take you out and let you look at it.

Mr. Ely: No, sir, I protest against any secondary evidence. The blower should be produced.

Captain Greer: The present intention of the defendant is not to have the blower introduced itself in Court.

Mr. Ely: There must be some reason why you don't want to produce the blower in Court.

Captain Greer: The reason being that such is an unnecessary expense and burden.

Mr. Ely: I think I shall try to bring out the real reason on cross-examination.

Q. I now hand you another photograph, Mr. Lieber, and ask you to state what that photograph represents?

(Whereupon, witness examines "Defendants' Exhibit 22-E".)

A. That represents the blower, showing the exhaust part of the blower.

Q. Did you have that photograph made?

A. I did.

Captain Greer: The defendant now offers in evidence the photograph identified by the witness as "Defendants' Exhibit 22-E".

Mr. Ely: Same objection.

Mr. Ely: Why don't you bring the animal in?

Captain Greer: I can't carry it around conveniently.

[fol. 867] Mr. Ely: Oh, yes you can.

Captain Greer: I will tender it to you to bring in if you want to have it in physically.

Q. I now hand you another photograph, Mr. Liber, and ask you to state what that photograph represents.

Mr. Ely: Same objection.

(Whereupon, witness examines "Defendants' Exhibit 22-F".)

A. That shows approximately the same view of the blower as the last photograph except that it is taken farther away from the blower.

Q. Did you have that photograph made too?

A. I did.

Captain Greer: The defendant now offers in evidence the photograph identified by the witness as "Defendants' Exhibit 22-F".

Mr. Ely: Same objection.

Q. Mr. Lieber, have you retained the custody and possession of that blower ever since it was installed in the Hastings Incubator in 1912?

A. Yes, sir.

Q. Has anyone ever endeavored to purchase that blower from you?

A. Yes, sir.

Q. Who, and under what circumstances?

A. Some years ago when the Buckeye people of Springfield, Ohio, I believe it is, anyhow, the Buckeye people were suing a man by the name of Cooley in New Jersey, I believe it was. I think it was Mr. Taggart who then repre- [fol. 868] sented them, sent me a telegram offering to pay me $50.00, I believe it was, for the blower.

Q. Was that sale consummated or made?

A. No, sir.

Q. Why not?

A. In my answer to the telegram I made a condition of the purchase that it was not to be used—not to be destroyed—and was to be used for exhibition purposes only.

Mr. Ely: I object to the testimony of the witness as to what the telegram might have contained. He can produce the original.

Q. Have you got that oringinal telegram now that you received?

A. No, sir, I have not.

Q. Well, was that condition agreed to by Mr. Taggart, or by the Buckeye Incubator Company?

A. No, sir, I never heard from them any more about it.

Q. And you still have possession of this blower?

A. Yes, sir.

Q. Is that the only portion of this Hastings Incubator that is now in existence that you know of?

A. Yes, sir.

Q. Mr. Lieber, at the time of Mr. Hastings leaving Muskogee in 1912 what were your relations with him? I mean by that, were they friendly or unfriendly or what-not?

A. They were always friendly. He was a hardworking boy; did nothing to cause me to have any enmity towards him.

Q. Do you know whether or not this Hastings Incubator in 1912 was a new thing in this community at that time or not?

Mr. Ely: I object as entirely immaterial.

[fol. 869] A. It was supposed—regarded as a new thing in the world, not only as a new thing in Muskogee.

Q. Was any publicity given to it or not, and to its operation?

A. Mr. Hastings was quite a publicity man and he got much more publicity out of his building and operation of the hatchery than most people would get.

Q. Do you know whether or not many people visited it in operation?

A. Lots of them did.

Cross-examination.

By Mr. Ely:

Referring to this blower which I said was installed in the Hastings Incubator, the discharge opening of this blower with respect to the room in which it was stipulated,—it was placed in the same compartment where the exhaust fan had been, but was set in a little different way on account of the difference in the make of the blower and the exhaust fan. If you had some of your business I could show you just how it was set. Exhibit "22" shows approximately the location of the blower. I couldn't to an inch or anything like that but that shows approximately. The intake part of it is shown in this Exhibit (indicating "Defendants' Exhibit 22") and the exhaust part is also shown in there. As to the exhaust being set into this partition, it was connected with it but it could hardly set in it because there wasn't sufficient place on the blower itself. It had to be connected with the compartment in which the air circulated.

Q. Yes, but I mean the partition wall came down flush with the outlet of the fan shown in "Exhibit 22-F"? Is that [fol. 870] right?

A. Yes, that was as near airtight as he could get it, and it was connected with the other side of the compartment of course with a pipe.

Q. "The other side of the compartment"—just what do you mean by that?

A. I mean this space in here that is shown on "Exhibit 22" in the—I would call it the northwest corner. It shows a curved wall there.

Q. Well, that is what you mean by the pipe. What I am getting at, was the mouth of this blower set right in this vertical partition?

A. Which one? This one or this one? (Indicating "Defendants' Exhibit 22".)

Q. I mean this vertical partition. Give me this. Was it set right in the vertical partition as illustrated by Figure 3 of "Exhibit 22-A" or Figure 2 of the same Exhibit?

A. My recollection is that it was set as shown in Figure 2.

Captain Greer: Of "Exhibit 22-A".

Q. Now, Mr. Lieber, as a matter of fact, when you and Mr. Taggart were discussing the matter of the possible sale of this fan, you asked Mr. Taggart $5,000.00 for the fan, didn't you?

A. Yes, sir.

Q. And he laughed at you and thought it a ridiculous price? Isn't that so?

A. No, Mr. Taggart, I don't think made the proposition to me orally. It came by telegraph as I remember.

Q. They offered you $50.00 and you asked $5,000.00?

A. Yes, sir, and the further provision that it was to be used only for exhibition purposes.

Q. Well, the truth of the matter was, they offered you [fol. 871] $50.00 and you asked them $5,000.00?

A. Yes, sir.

Q. And that is the reason you didn't sell it?

A. No, sir.

Q. You deny that?

A. That is one of the reasons I didn't sell it.

Q. They didn't meet your $5,000.00 price, that is true, isn't it?

A. That is true, yes, sir.

Q. Now, when did you take these photographs that form Exhibit 22-B, C, D, E and F? When did you take those?

A. Last week.

Q. Who was present when you took those?

A. Mr. Warren.

Q. Was Mr. Greer present?

A. No, sir.

Q. Did Mr. Greer go out to see this blower at any time you know of?

A. I think he went out there yesterday to see it.

Q. Were any arrangements made at any time to bring this blower in here?

A. No, sir.

Q. Not at all?

A. No, sir.

Q. Were you present when Captain Greer was there at the farm yesterday?

A. No, sir.

Q. Were you ever present when Captain Greer was there?

A. No, sir.

Q. Who is this Mr. Warren?

A. He is a friend of mine here that knows how to operate a kodak.

Q. Did you ever measure this? Were you present when these photographs were taken?

A. No, sir.

Q. You were not present?

A. No, sir.

Q. How often have you seen this blower since 1913?

A. Oh, I have seen it on an average I guess of once a year. I see it every time I am out to Mr. Hastain's farm.

Q. Were you ever present when the outlet portion of this blower was measured?

A. I don't recall ever measuring it.

[fol. 872] Q. Were you ever present when anyone else ever measured it?

A. I don't recall.

Q. As a matter of fact, were you not present when it was measured when Mr. Taggart was there?

A. I don't remember it. I don't recall of Mr. Taggart and I ever being out there together.

Q. Don't you remember that the diameter of the outlet as shown in Exhibit "22-E" and "22-F"—Do you know what the diameter is?

A. I know approximately. Not to an inch.

Q. It is twelve (12) inches?

A. I though- it was eight (8) inches; it may be twelve (12).

Q. Now, you know very well it was twelve (12) inches across there?

A. No, sir, I don't. The number of the blower, or number on the blower would tell from the description of the machine from the factory.

Q. What is that number?

A. It is either 21 or 12, I don't know which.

Q. It is two and one-half (2½), isn't it?

A. Yes, I believe that is what it is, 2½, yes.

Q. As a matter of fact, don't you know a 2½-inch blower of this make is twelve (12) inches in diameter at the outlet opening?

A. No, sir, I don't know a thing about it, Mr. Ely.

Q. Did Captain Greer ever ask you what the diameter of that opening was in his discussion with you prior to your going on the stand?

A. I don't think he did.

Q. He never asked you that?

A. I don't think so.

Q. Did he ever ask you if it was an eight (8) inch opening?

A. I don't think so.

Q. That blower is now out on the farm, is it?

A. Yes, sir.

[fol. 873] Q. We can go look at it, I suppose?

A. I will give you an order any time on the man that has custody of it.

Q. Where did you get this blower from? Where did it come from?

A. Way up north somewhere.

Q. The American Blower Company, wasn't it?

A. It shows on the photograph, I believe. I don't recall.

Q. It is the American Blower Company of Buffalo—or Detroit? What is known as a "Sirroco" Blower?

A. I believe that is right.

Q. Number Two and one-half (2½)?

A. That is what it looks like, yes.

Q. And you don't know the diameter of that outlet opening?

A. I never did measure it that I know of.

Q. Now, just when was it that you purchased this blower?
A. It was early in 1912.
Q. You mean, it might have been any time during the first half of 1912?
A. No, it was I imagine in January of 1912 because it was bought within three days after he first started the incubator with eggs in it.
Q. Was it a new blower at the time?
A. Yes, sir, brand new.
Q. And how was it shipped to you?
A. By express.
Q. C. O. D.?
A. C. O. D., yes, sir.
Q. And you had to pay for it?
A. Yes, sir.

The witness resumed under cross-examination by Mr. Ely as follows:

Before this blower was purchased by me, Mr. Hastings had not completed any hatches in the machine. He had [fol. 874] gotten along with the hatches only two or three days according to my recollection. I don't think it was a full hatch that he had there; don't think it was a capacity hatch at that time. That is to say, that whatever hatches he had in this machine prior to the purchase of the blower would have been probably started during the month of January. He probably ruined some hatches but as he didn't do it while that exhaust fan was in there. My recollection is that he never pulled off a hatch while the exhaust fan was in there. By "exhaust fan", I am referring to this other type of fan such as is shown in this Exhibit No. 25. At no time during the period that the exhaust fan was in did Mr. Hastings have the incubator full of eggs.

I don't know when that picutre which is in Exhibit "25" was taken. I don't know when it was taken; it was taken sometime early in 1912. He took pictures of the whole thing before he ever started it. That is not something I heard. I was right there every day. Not all the time of course. I was in and around the place there; had my office right on the same lot.

Now, in this Exhibit "26-D", the incubator is apparently full of eggs. When that photograph was taken I do not know what kind of a fan he had. I couldn't tell you whether

he had the exhaust fan or the blower, because it doesn't show either fan in that Exhibit. I don't know then when that picture, "26-D", was taken, what kind of a fan he had in the incubator.

I don't recall being present when any of these photographs of the incubator that were shown were taken. And [fol. 875] my testimony is that as far as I know, the exhaust fan was never used through a complete hatch—was only used about three days at the start and then the blower fan was substituted.

I testified by way of deposition involving this Smith Patent back in 1925. I remember that. Here in Muskogee. Yes, sir. Mr. Linebaugh examined me. I think so.

Q. Do you remember testifying in that case as follows:

"A. The only difference that I remember of was that the first hatch was extremely low, and Milo Hastings attributed it to the ordinary exhaust fan, which was being used to circulate the air."

Q. Do you remember so testifying?

A. Yes, sir, I guess I did.

Q. Then your testimony this morning that Milo Hastings never went through a complete hatch. Now you swear that is what you said back in 1925.

A. When you are thinking of things that happened years ago, the more you think of them, the more you get onto the details.

Q. Isn't it a fact that the testimony which you gave eight and a half years ago was eight and a half years nearer the date the thing occurred than today?

A. Yes, but that was twelve years after the thing occurred, or fourteen.

Q. There is another thing I want to ask you about. I notice in this Affidavit and what you testified this morning, "that the incubator was operated at least on one occasion [fol. 876] at full capacity of 30,000 eggs". You testified that way this morning, didn't you? That is your testimony today?

A. Yes, sir, I think so, and it was.

Q. And you made Affidavit to that effect for the benefit of the defendant here?

A. Probably I did.

Q. Do you remember testifying at that former proceeding in 1925 as follows:

"A. The largest amount it ever had in it, if I remember correctly, was about 25,000."

Q. Do you remember so testifying?

A. I guess it is if it is on there.

Q. Did you so testify?

A. I guess I did before Mr. Linebaugh.

Q. And you testified at that time that the largest amount of eggs ever in the incubator was 25,000?

A. As I remembered it then, yes. That meant five (5) compartments full.

Q. Your testimony this morning, however, was 30,000 eggs; had the full capacity in; do you remember that?

A. Yes, sir, and I think the latter statement is correct.

Q. That is, you think your testimony today is correct, where the testimony given back in 1925 was wrong?

A. It might have been off some.

Q. It might have been off some? You have changed it for the benefit of this defendant, haven't you?

A. No, sir, I have got no interest in this thing one way or the other. I have done lost my money in it and don't expect to get it back.

[fol. 877] Q. And you testified again, a second time in that proceeding in 1925. Do you recall this testimony? The question was:

"Q. You have also stated that the greatest capacity ever in the machine at one time was 25,000 eggs, have you not?

"A. Yes, sir, that is my recollection."

Q. You so testified back in 1925, did you not?

A. That was my recollection at the time, yes, sir.

Q. Prior to your taking the stand you have had some conferences I presume with Captain Greer here? I know you have? A. Yes, sir. Yes, sir.

Q. And he also gave you a copy of the testimony that Milo Hastings gave in this same proceeding, and you read it over?

A. I did not read it over. He showed it to me, yes.

Q. Now, are you positive, Mr. Lieber, that this exhaust fan was set at an angle in that fan compartment?

A. I am as positive of that as I am of anything that happened twenty-two years ago.

Q. In fact, you are not very positive about it? That is the truth of the matter, isn't it?

A. I know that the fan couldn't set in that space without lapping over one side of the wall because the fan was twelve (12) inches or more in diameter, and the space where he shoved the air in was approximately eight (8) inches.

Q. Where did the moisture pan set with respect to this exhaust fan?

A. It was right under the exhaust fan.

Q. It was a square moisture pan?

A. Yes, sir, approximately square.

[fol. 878] Q. And set right underneath the exhaust fan?

A. Set right under the exhaust fan and I think right under the intake of the blower.

Q. We are talking now about the exhaust fan in this particular set of questions. I am not asking about the blower, I am asking you about the exhaust fan.

A. All right.

Q. Was the moisture pan changed when the blower was put in?

A. I don't recall as to that. I think he used the same pan.

Q. Used the same pan?

A. I think so.

Q. That moisture pan is shown in Figure 2 of Exhibit "25", isn't it? Directly beneath the fan?

A. Yes, sir.

Q. Who told you—when did you hear recently a discussion of the setting of that fan at an angle?

A. Well, I knew it was setting that way I guess when the thing was built for that matter, but my attention was called to it since Captain Greer came here.

Q. Yes, he showed you a sketch that Mr. Hastings made with a red pencil on Figure 2 of Exhibit "22-A"?

A. Well, this is the first time my attention has been called to the red sketch on there.

Q. But he told you, did he not, that Mr. Hastings testified that that fan was set at an angle in that fan compartment?

A. Yes, I think I saw that part of Mr. Hastings' testimony.

Q. That this fan was set at an angle?

A. Yes, sir.

Q. As a matter of fact, isn't that the basis of your present recollection that that fan was set at an angle?

A. Those things will naturally refresh your memory and you will think of things you never thought of before when [fol. 879] you see a photograph of it, and testimony. That is true of any testimony.

Q. Will you look at that photograph in Exhibit "25"? Is that approximately the angle of the fan?

A. That shows the way it was set in there all right.

Q. And the moisture pan was square?

A. I won't say it was square.

Q. Well, it was square?

A. No, sir, I won't say it was square any more than twenty-four (24) inches one way, and eighteen the other.

Q. That is the way your memory has been refreshed—your memory has been prodded on it?

A. Not "prodded", no, sir. Just my recollection has been called to those things.

The witness resumed under cross-examination by Mr. Ely as follows:

Milo Hastings kept the books, and he had charge of the running of the incubator. And I was busy on my other interests here in Muskogee. I was running four moving picture theatres and I had a lot of interest in real estate developments here. Muskogee was a boom town at that time, and I was busy in the real estate business in connection with the boom in Muskogee. I was trying to do my part. As a matter of fact, I left the matter of the operation of the incubator up to Milo Hastings and Eddie Hastain, the other member of the Corporation. Mr. Hastain is still alive—he lives at Phoenix, Arizona.

Whatever I know about, or what I know about the percentage of hatch, etc., is what I got from Hastings. I recall [fol. 880] that we had some eggs hatching ourselves in the incubator, and we got the ordinary hatch for that season. And I so testified and so made Affidavit that has been filed in this case, that I had some eggs set for me in this incubator. Yes, sir. I don't know whether I did before or not, but I did. That was especially true of the second year of the hatch. That is to say, I know I had some eggs in this

second year the thing was operated, but I am not very sure about the first. I am not so sure about the first because we had been in the habit of hatching eggs with hens out on the farm and if I had any chicks I probably got them from Hastings because he got some eggs and put them in there himself. As a matter of fact, I was running a farm at that time, living on it. I know that we put eggs in that incubator in 1913. I think we had some in in 1912. By "we", I mean, well, my wife probably attended to it. I probably brought the eggs in and left them with Hastings.

Q. Your recollection it not very clear on that?

A. Well, that is the way it would have happened.

Q. Didn't you testify while on the stand in 1925:

"A. I don't think I put any eggs in myself."

A. Perhaps I did.

Q. And you so testified, did you not?

A. If it is there, I did, yes, sir.

Q. I show you that part which is underlined.

(Whereupon, counsel exhibits transcript of testimony to witness, which is later marked for identification "Plaintiff's Exhibit 100".)

[fol. 881] A. Yes, I know I bought some chicks.

Q. You bought some chicks but I am asking you if you didn't testify back in 1925 that you didn't think that you put any eggs in yourself?

A. I am satisfied I testified it or it wouldn't be in there.

Q. Now, as a matter of fact, Milo Hastings left Muskogee in May, 1912, didn't he?

A. I don't think so.

Q. He left while the hatching season was going on, did he not?

A. I don't think so.

Q. Your recollection is that he left in the summer, as you have testified this morning, is that true?

A. Yes, sir, I think that is right.

Q. And that is your best recollection?

A. That is my best recollection that that is when he left.

Q. Your recollection this morning seems to be somewhat vague, does it not, Mr. Lieber, on that point?

A. No, sir, not any more so than it has ever been.

Q. Did Milo Hastings adopt the scheme of Custom Hatching after he had operated it with eggs of your own purchase?

A. No, sir, he adopted that before he ever started the incubator to going at all, is my recollection of it.

Q. That is your present recollection of it?

A. Yes, sir, he had intended to do Commercial Hatching but he found on figuring it out at the last that he could make some quick money by doing Custom Hatching, and that is the reason he changed his plan.

Q. Did you not testify in 1925, Mr. Lieber:

"A. He started to operating it early in 1912. He had [fol. 882] originally told me that $1000.00 would be all he would need. Which I agreed to furnish. Before he had the hatchery in operation, he found that this would not be sufficient and I agreed to furnish another $1000.00. With this he succeeded in starting the hatchery but he soon discovered that this would not be sufficient to carry the work through. So he hit upon the plan of doing custom hatching."

Q. Do you remember so testifying in 1925?

A. Yes, sir, I did.

Q. Therefore, you testified in 1925 that Milo Hastings started out hatching your own eggs and then afterwards he took on the plan of Custom Hatching?

A. No, sir, I don't understand it to read that way, that he "started hatching". It shows on its face what it means.

Q. That is the way you testified back in 1925?

A. Yes, sir, that is the way I testified.

Q. Now, you said Mr. Hastings was an extraordinarily splendid publicity man?

A. I so regarded him.

Q. He was rather persuasive, wasn't he?

A. Well, I don't know about that.

Q. Well, he persuaded you, at any rate, to sink some money into this proposition?

A. Didn't take much persuasion to get me into it.

Q. And did he not father these various articles that appeared in the various papers, as far as you know?

A. I imagine he did.

Q. Didn't Milo Hastings become disgusted with the mess he had gotten the business in, and didn't he finally leave and

turn it over to you and tell you to do the best you could with it?

[fol. 883] A. I think that is about the way of it. I imagine it was the financial mess that he had got the thing in.

Q. But he got disgusted and left and left the thing on your hands?

A. Yes, sir, that is right.

Q. And then you tried to operate it in 1913 through Mr. Hastain and Mr. Dierfield, is that right?

A. Mr. Dierfield was—wait—Mr. Dierfield was Mr. Hastain's brother-in-law and on the strength of what Mr. Hastain had seen the hatchery do during 1912, Mr. Dierfield put $500.00 into the business and he and Mr. Hastain operated it in 1913.

Q. Did you intend to give the impression by your testimony this morning that the operation in 1913 was a success?

A. It hatched all right.

Q. Did you intend to give the impression that the operation in 1913 was successful?

A. So far as the operation of hatching chicks was concerned it was, but financially it was not.

Q. Just a minute—The operations in 1913 were a flat failure, were they not?

A. Absolutely not; hundreds of chickens were taken out to Mr. Hastain's farm in 1913 from that hatchery.

Q. Do you remember testifying in 1925 the following:

"Q. How long did Hastain continue to operate in the spring of 1913?"

and your answer was:

"A. My recollection is that they only put in one batch of eggs and closed down the hatchery when the hatch was unsatisfactory."

[fol. 884] A. I probably did. I said that was my best recollection and it was.

Q. But you changed your recollection for the benefit of this defendant today?

A. No, sir.

Q. Did you not also testify in 1925 in answer to the question:

"Q. After Milo Hastings left, did you or Ed Hastain undertake to operate the hatchery?"

and your testimony in reply to that question was:

"A. Mr. Hastain and a brother-in-law of his named Dierfield, operated the hatchery during a part of 1913. But neither of them knew anything about the principle of the hatchery and they had no success."

Do you remember so testifying in 1925?

A. I suppose I said that.

Q. All you ever got out of this Hastings Incubator was five hundred (500) pullets, isn't that true?

A. That is probably so at the windup, but they were hatched in that.

Q. You invested $25,000.00 in that hatchery——

A. $25,000.00?

Q. Did I say $25,000.00?—$2500.00, and you only got five hundred (500) pullets?

A. That is about right.

Q. $5.00 a pullet?

A. I guess so.

Q. Now, Milo Hastings, during the time he was operating this incubator in Muskogee, was hatching eggs for other people? That is, doing Custom Hatching?

A. Yes, sir.

[fol. 885] The witness then resumed under cross-examination by Mr. Ely:

At the same time he was carrying on hatching of eggs that were purchased by him or the Company, he bought some eggs. I didn't know what portion of the business was Custom Hatching and what was his own hatching. I never kept the books. No one ever absconded with any profits. Not that I know of; don't think there were any profits financially. I never made a penny out of it, and Milo Hastings never made a penny out of it, and Hastain never made a penny out of it. We all lost money and lost time.

Q. Do you remember in answer to the question in 1925 when you were testifying, the question was:

"Q. Was your venture in this matter successful or otherwise?"

and you said:

"A. I would say it was otherwise."

Do you remember so testifying?

A. I guess I said that.

Q. Do you remember testifying in 1925:

"A. We could not figure out its failure to hatch in 1913, except on the theory that Milo Hastings, the inventor, was the only man who knew how to operate it."

A. I probably did.

Q. But Mr. Hastain was about the incubator quite a bit during 1912, wasn't he?

[fol. 886] A. Yes, sir, he knew more about it than anyone outside of Milo Hastings.

Q. But he ran it in 1913?

A. Yes, sir, he made it hatch but didn't make any financial success.

Q. You might have hatched a few chickens, but, as a matter of fact, the operation in 1913 was a failure and you tore the thing down?

A. I couldn't tell you that. I know I didn't make anything out of it but it did hatch some chickens.

Q. A few?

A. Yes, sir, my recollection is quite a few because Mr. Hastain had a place fixed out at his farm and he took chickens out there.

Q. As a matter of fact, the only hatch made in 1913 was one batch of eggs, and that was a failure?

A. I didn't say we only made one hatch and that was a failure. I didn't say it was a failure as far as hatching was concerned.

Q. But, as a matter of fact, after that one hatch in 1913, the incubator was torn down?

A. After the 1913 effort, whether more than one hatch or not, I couldn't say positively, but the incubator was torn down and moved out to Mr. Hastain's farm and my farm.

Q. The incubator was not moved out?

A. I mean, it was torn up.

Q. And they used the lumber for repairing fences and buildings around the farm?

A. That is correct.

Q. And the only thing left of the incubator today is this blower, you testified?

A. Yes, sir.

Q. Which has a twelve (12) inch outer opening?

A. I couldn't tell you about that because I never measured it.

[fol. 887] Q. You will find out.

A. Don't believe it is that large, though. It has a twelve (12) inch intake, I know.

Q. I am talking about the outlet?

A. I know, you are talking about the exhaust, but don't believe it is twelve (12) inches. It may be though.

Q. Now, Mr. Lieber, as a matter of fact, these drawings, "22" and "22-A", are what you might call "diagramatic". They don't show the actual construction of the incubator as it was in Muskogee?

A. Well, you couldn't say it was an architect's drawing, no, sir, but it is as near as you could get at it without a photograph or architect's drawing.

Q. As a matter of fact, it isn't a drawing of the thing as it was actually installed here in Muskogee? You know that isn't true?

A. Not as to every detail it is not, but approximately it is.

Q. You are hitting on details. That is a question of what might be details and might not be details. The incubator here in Muskogee differed in many respects from what is shown in the drawing "22-A"?

A. I don't think it differed in any material respect at all.

Q. As a matter of fact, wasn't there a flume or a duct on top of those chambers which is not shown in that drawing?

A. I don't think so. This space here in Exhibit "22-A"——

Q. Now, wait a minute. "This space", what do you mean?

A. Shown in Figure 4 just above the sections. That of course covered the intakes to each separate section. My recollection is that there was no flume there but it was that entire space from the front end of the section to the back end of the section was open there so that he could [fol. 888] open his valve and let the air into either section that he wanted to or as much as he wanted to.

Q. And was it open clear to the roof of the room or the housing?

A. No; no; this incubator was set right in the room, built right in the room. The room was no part of the incubator. That is, the building was no part of the incubator.

Q. As a matter of fact, Mr. Lieber, was there not a narrow flume extending over the top of the incubator approximately the width of this opening, or those openings?

A. I don't remember it that way.

Q. Don't you remember testifying in 1925 that there was such a flume and that you remembered it because you tore it out?

A. Maybe I did.

Q. Do you recall so testifying?

A. No, sir, I don't.

Q. But you testify today that there was no such flume in there, is that right?

A. I don't remember it if there was, because there was no necessity for it that I could see.

Q. Now, that is reasoning? You are doing that by some process of reasoning and not recollection as to what the actual construction was, is that right?

A. Yes. I might add here that he kept the anteroom, the space from the incubator, from the front of the incubator to the wall of the house, he kept that practically the same temperature that he did his incubator.

Q. Now, Mr. Lieber, you said this morning that there were seven (7) compartments in that incubator. Is your recollection clear on that?

A. Yes, sir (counting on "Defts' Ex. 22"), one, two, three, four, five, six, seven.

[fol. 889] Q. Well, I know. When you answered "seven" you just counted off seven on that Exhibit "22", didn't you, right now? A. My attention has been called to it before. I have seen this drawing before I came up here, or a copy of it, but I remember it was a 30,000 egg incubator, six (6) compartments at five thousand (5,000) each, and one (1) compartment that he used to take the chicks off in, because he had to have different temperatures in each department.

Q. Each "compartment", you mean?

A. Each compartment.

Q. As a matter of fact, you testified back in 1925 there were only six (6) compartments?

A. I probably did. That is where I got the idea that 25,000 capacity is all that it ever had at one time.

The witness resumed under cross-examination by Mr. Ely:

The purpose of those shutters or those slides at the top of each compartment was to let the amount of heat that he wanted into each compartment, to keep it the proper temperature. That is to say, that kept each compartment at a different temperature, according to his idea about hatching. When the eggs were in one stage of hatching they were set in one compartment, and then moved to another, and then moved to another. It was arranged so that he could do that in the case of a continual hatch. He could just move eggs from one compartment to another and leave the temperature what it should be from the date the eggs were first put in the incubator, but he could hatch them [fol. 890] in one compartment if he wanted to. He kept the temperature of the compartments at a different temperature according to the age of the eggs, according to what the standard was, or what the temperature of the eggs should be at a certain period of their hatching. And then he moved the eggs over to the last compartment at the time the chickens were hatched. I don't say he did that in every case, but it was so equipped so he could do that. That is to say, when the incubator was operating, say, when he had a few eggs, he might set all the eggs in one compartment. He would have to keep the temperature at different stages according to the age of the egg. His idea was, according to my recollection, that he would have a continuous hatching all the time. That is, he could start eggs in one compartment, carry on for a few days, and then move them to another compartment and leave for a few days. And then move on for another period until they finally got down to the end. Yes, that is, if he was crowded for space, as new eggs came in he would put the eggs in the first one, and keep on moving them, and he would be putting eggs in the first compartment and taking chicks out of the last one at the same time. And in the intermediate compartments would be eggs further advanced in the incubation. And he adjusted those slides so more or less hot air would

go into each compartment, to control the temperature. The temperature of the different compartments was different. My recollection is that the temperature varied about ten degrees from the starting to the end. I don't know whether at the end, or the middle, or the first, but I know there [fol. 891] is a difference in the temperature of hatching chickens at the different stages of hatching.

I testified in 1925 as follows:

"A. He had valves or cut-offs connected with each of these sections, or compartments, by which he could regulate the heat of the air in each section or compartment. He could have one temperature in one compartment and a different temperature in another. He explained to me at the time that this was necessary because when eggs when first placed in an incubator they required the maximum amount of heat, whereas a few days before they hatched the chicks in the eggs furnished considerable heat, and therefore it was not necessary to supply as much artificial heat just before the chicks hatched."

I then went on to say:

"A. He gave this as his reason for having to have the device so that it would have one temperature in one compartment and a different temperature in another compartment."

I think that is right. And that is my recollection today.

As to what the construction was underneath those compartments—there was an outlet underneath according to my recollection now. My recollection is that it was very much the same as above the compartments. The space was the same and led in to where the fan was, or the blower. [fol. 892] I am clear on it for the reason I know it couldn't work any other way. I am connecting that up with the fact that I did tear it down and that is how I remember it; had to be some place for the air to get out and circulate. I do not know whether the outlet was the same size as the intake. I remember testifying in 1925 when I was asked somewhat similar questions:

"A. I am not positive though about the lower air conduit. I know the upper conduit was there, because I tore it out myself. I don't remember, however, about the lower one."

I think I said those very words.

This upper conduit to which I was referring in 1925 was the space above the compartments.

Q. As a matter of fact, wasn't there a narrow flume that went over the top of the incubator, a thing which is not shown in that picture (Indicating "Defts' Exhibit 22-A")?

A. There may have been, Mr. Ely, but I don't remember positively one way or the other; couldn't say whether it was there or wasn't there.

Q. And didn't that flume have a door or gate so that there was communication from the upper air conduit into the fan chamber?

A. I couldn't testify as to that because I don't remember.

Q. How did you get fresh air in and foul air out of that incubator?

A. I couldn't tell you about that. There was a door connecting the compartment that the fan was in with a little anteroom perhaps six (6) feet square.

Q. And there was a door back in the heater room.

A. Back on the south here.

[fol. 893] Q. Which was the south end?

A. This end (Indicating on "Defts' Ex. 22-A").

Q. At the south end where the heater pipes were?

A. Yes, sir, a little door so he could get into where the gas burner was, a narrow door, just barely big enough to get in.

Q. And weren't those doors the only way by which the fresh air could get into the machine?

A. I couldn't say about that. Was that door you mentioned and then one over here where the blower was.

Q. Do you remember testifying in 1925 as follows: The question was:

"Q. Was there any arrangement for getting rid of foul air?"

and your answer was:

"A. There was an opening or a door from the work room into the fan chamber. That I think was the only place where fresh air could be taken in. And, of course, when you took the fresh air in the foul air would get out.

"Q. The intake of fresh air, and the exhaust of foul air was accomplished by means of this door, or opening, was it not?

and your answer to that was:

"A. Yes, sir, except that there was also a door into the —connecting the work room end with the heating chamber which could also be used for letting in fresh air or expelling foul air.

[fol. 894] "Q. Were these doors kept open at all times?

"A. No, sir, they were kept closed most of the time.

"Q. What determined when they should be opened?

"A. The mind of the operator, I guess, or the temperature of the different compartments.

"Q. Was it in any way regulated automatically?

"A. Not that I remember of."

Q. Do you remember so testifying?

A. Yes, sir.

The Witness resumed: What is known now as the Ritz Theatre in Muskogee where your incubator was, was it known as the Hinton Theatre then.

I wasn't running the Hinton. I was running one right adjoining called the Wigwam.

But when reference was made to the Hinton Theatre, that is where the Ritz Theatre is now. But the Ritz Theatre has been enlarged now, and where the Ritz Theatre is now only covered the space where the office was.

I want to explain that the place where the Hinton covered was the space used for the office of the hatchery.

While Mr. Hastings operated this hatchery in Muskogee he got a lot of eggs mixed up. People got back a lot of chicks from eggs they never sent. He got it in an awful mess in that respect. And people might send Plymouth Rock eggs and get back Rhode Island chicks from the hatchery. Yes, Milo Hastings wasn't a bookkeeper. But they would get back chicks from somebody else's eggs. That is what got him discouraged like it did.

[fol. 895] I do not recall how many customers there were of this incubator, I don't know, the books would have shown, but I know there were lots of them. I think I told Captain Greer about some of them, Mr. Cory and Mr. Pitts. Was a fellow here used to call him "Chicken Anderson", I think he had some eggs in there; had lots of eggs. I don't think I rememebrd Anderson to Captain Greer because Anderson is dead. But I did give to Captain Greer, or to some of the defendants in this case, I gave the names of all the

customers I could think of. He asked me some, and anybody who ever asked me, I did. By "he", I mean Captain Greer.

Subsequent to 1913 I continued to operate my farm until 1921. I raised poultry on that farm, been daffy about chickens all my life, I reckon.

Q. You used an incubator?

A. No, sir, just bought chicks; never used an incubator; one was enough for me.

Q. Your experience with the Hastings Incubator was enough for you?

A. Yes, sir, one was enough for me.

I have raised quite a lot of poultry on that farm since 1913. Started a chicken farm east of town after I left my own farm.

When the blower fan was substituted for the exhaust fan he had to have a slightly different connection for the outlet, and I will add this: The exhaust fan had an electric motor, directly connected with it, and the blower fan required a belt and separate motor.

I remember testifying in 1925 "the only change"—I will read the question first:

"Q. From the first construction there were some changes [fol. 896] made in the construction or method of operation before Milo Hastings abandoned the enterprise, was there?

"A. The only change that I have any knowledge of was substituting the blower for the exhaust fan in order to get more positive circulation of the air."

That is my recollection.

I have been interviewed a number of times in regard to this Hastings Incubator. As to a number of defendants coming to me in regard to this Hastings Incubator, about the only two I know of was when Mr. Taggart was in it before, and this time with Captain Greer. Those are the only two I know of having any difficulty about it. I was not interviewed at the time the Cooley case was on by a man named Hicks. Never did interview me; wrote me some letters. I have seen Reese Hicks off and on—, I have seen Reese Hicks four times in the last twenty-two years. Well, Mr. Cooley might have sent Mr. Hicks down here. I don't know about that. I have talked to Reese Hicks, I know that, and he might have said Mr. Cooley sent him. Mr.

Reese Hicks might have interviewed me for Mr. Cooley and asked me about going to New Jersey to appear as a witness for him, or for Mr. Cooley. He may have done it. I don't remember that very clearly. I remember getting letters from Mr. Cooley and asking me if I would come. I do not now remember the interview I had with Mr. Hicks. I may have remembered it at that particular time, but I certainly don't now. I remember meeting Mr. Hicks several times.

Q. At the time that Cooley case was on don't you recall that as one of the inducements for your testifying with [fol. 897] regard to this Hastings Incubator in the Cooley case, was that you were promised the money which you had lost, promised to be reimbursed for the money which you had lost on the Hastings Incubator?

A. I don't remember that.

Q. Don't remember that at all?

A. No, sir, don't remember that. He promised to pay my way to New Jersey and back if I would come there as a witness.

Q. Didn't you give this testimony in answer to a question asked you in 1925:

"A. He said that before the thing was over with I would probably get my money back.

"Q. Referring to the money you had put into the Muskogee Hatchery?"

And your answer was:

"A. Yes, sir."

A. I remember so testifying and he probably wrote me that in that letter; that I would "probably" get it back, but I never figured I would.

Q. Yes, but you testified in that case that either Mr. Hicks or Mr. Cooley said to you that before the thing was over that you would probably get your money back, referring to the money which you had put into the Muskogee Hatchery?

A. They may have said that, yes, sir.

Q. And you so testified in 1925?

A. If it is in there I sure did.

The witness resumed under cross-examination by Mr. Ely:

[fol. 898] In this corporate set-up of the Hastings Hatchery I think I owned 50% and Eddie Hastain one (1) share and Milo Hastings the balance. Milo Hastings had 49%. I think that is it. The consideration for the 49% which Milo Hastings got was not the agreement that Milo Hastings would turn the patent over after he got it on the application he had pending on this scheme of his. That was the agreement after Milo gave the thing up and left work. That is my understanding of it. It is a fact that when the Corporation was formed, at the very start of the thing, Milo Hastings agreed to turn his Patent Application or any Patent he might get over to the Hastings Hatchery, Incorporated. I think Milo agreed to that, yes. Yes, I think he agreed to it, and I think it was afterwards consummated when he decided to leave here. And the agreement, one of the considerations for the 49% was the agreement of Milo Hastings to turn his Patent Application over to the Company, I think that is so. I wouldn't say positive because it has been so long ago. As a matter of fact, these things happened twenty-three years ago since we went into it, about twenty-three. And I haven't anything which is contemporaneous, haven't anything now which is contemporaneous with the things which went on in 1912, nothing at all. No scrap of paper or documents or anything of that kind. I am just relying upon my recollection of the thing, that is all, as it may be refreshed by reading over some testimony or looking at some drawings.

Mr. Ely: I introduce in evidence as "Plaintiff's Exhibit No. 100" a certified copy of the depositions of a number of [fol. 899] witnesses, giving their testimony in what is known as the Stone case, containing the depositions of L. A. Cory, S. J. Anderson, R. Shanafelt, John G. Lieber, Huston A. Hogan, and L. W. Pitts.

Captain Greer: This testimony is objected to on behalf of the defendants as being secondary evidence, and incompetent, and irrelevant, and having no place in the trial of any of the issues involved in this case.

The witness then resumed under cross examination by Mr. Ely:

This farm where this blower is now is about three miles north of town.

Redirect examination.

By Captain Greer:

In connection with Mr. Dierfield's putting this $500.00 into the Corporation that I was asked about, that occurred—it was after Mr. Hastings had quit the hatchery and before the next hatching season. And he was a brother-in-law of Mr. Hastain. He is the one that operated it in 1913, he and Mr. Hastain together.

Q. Now your attention was directed to your testimony given in a deposition in 1925 in which you were asked as to whether or not you regarded your venture in the 1912 Hastings Hatchery as successful or otherwise and asked if you did not state that you would regard it as otherwise. Please tell us what you were referring to in the use of that word "otherwise," as to the operation of the incubator or as to the financial end of it?

[fol. 900] Mr. Ely: I object to that question. The testimony as given in his previous examination stands, and I object to having a qualification or explanation for the benefit of these defendants.

A. By "otherwise" I meant from a financial standpoint, as far as I was concerned.

I have no hopes or expectations of getting back the money which I invested in this Corporation in 1912.

This concluded the testimony of the witness Lieber.

(It was stipulated by the parties that the signature of the witness to this Deposition, when written out, is waived.)

L. W. Pitts, was called as a witness for and on behalf of defendants, and after being first duly sworn according to law, testified by deposition as follows, said deposition being offered and received in evidence:

Direct examination.

By Captain Greer:

My name, age and residence are: L. W. Pitts; fifty-three, age; 320 South 15th, Muskogee. At present I am a retired

Government Clerk. I have lived in Muskogee since January 1st, 1906. I was living in Muskogee, Oklahoma, during the years 1911, 1912 and 1913. At that time I was connected with the Indian Agency.

[fol. 901] I have engaged in the poultry business on a small scale. I have always experimented with small incubators and did considerable hatching and sold baby chicks. I guess I was about the first one in Muskogee who ever sold baby chicks. I have operated an incubator. Ran a couple of Cyphers. That was about 1910 or '11 I got them. There was such a thing as a Poultry Association in Muskogee, Oklahoma, around about that time. I don't recall exactly what dates. I was a member of it.

I recall an incubator having been installed, built or operated in Muskogee, Oklahoma, by a man named Milo Hastings. After Mr. Hastings came here and started that incubator I met him. Well, I think he came here around December. I heard the boys talking about it, and I think he started up in January, 1912. I mean he started the operation of an incubator here in Muskogee about 1912, about January is my recollection. As to where that incubator was located, well, I don't know the number of the street but I think where the Ritz Theatre is located now. I think about that filling station on Court Street. The Ritz Theatre is what was formerly known as the Hinton Theatre.

I had occasion to visit that incubator that Mr. Hastings was operating. On several occasions. I remember one time we all had a Poultry Show here and we all went over one night and he wanted to show us around, and the reason I remember so well it was zero weather. That was 1912. The incubator was being operated at that time. It had eggs in it. I never had any eggs myself placed in that incubator for hatching. I was running two Cyphers myself and [fol. 902] doing custom hatching besides. I never placed any eggs myself in Mr. Hastings' incubator for hatching. He ran it until May or June, I think, and then I think he left here. It has been a long time ago to remember things. That incubator was operated throughout 1912. Then he had a little poultry farm out here, and then I lost track of him. I think he left here. The next season I think Mr. Lieber operated it but I never visited it that year. I was in it two or three times after that cold night. It hadn't been running long enough at that time to know what it would do

when we visited it—the Association visited it. I just remember going into a brick room and it was awful hot in there, and it had trays all around in there. That is all I remember in there; going from zero to 103, I can remember very well. Eggs were in these trays. I saw Mr. Hastings there at that time. He was demonstrating the machine to this Poultry Association. I didn't know then anything at all of the percentage of hatching of eggs that were placed in there. I was there later though and saw chickens hatching and eggs pipping and half out.

Cross-examination.

By Mr. Ely:

Muskogee was just trying to get the poultry industry going then. We were one of the first cities to have a Poultry Association around here, I know. I don't remember how long this Poultry Association had been running, seemed to me like three or four years. I remember Mr. Shanafelt, a member of that Association.

Either January or February was the date of that Show [fol. 903] that right afterwards we went down to Hastings' place. I know it was awful cold, about January 21st, yes, sir, along in there. I say the incubator was being operated at the time we folks went down there from the Show. I am pretty sure it was. I do not know how many eggs it had in it.

Q. Didn't Mr. Hastings simply show you one tray of eggs he had in there?

A. Well, I couldn't say how many trays of eggs he had in there, but I know there was more than one. I remember that Mr. Hastings perhaps pulled out one tray of eggs and showed it to us. There might have been more, but I don't have any recollection of there being more, not at that time.

I do not remember testifying here in Muskogee in the year 1925, in September, giving testimony by way of deposition with regard to this Hastings Incubator. My first name is Lewis. Lewis W. In 1925, I lived at this same place; 320 South 15th Street. I was at that time forty-four years old, just about. It surely slipped my mind if I ever testified. I know Mr. Linebaugh. I remember when it was here and I believe I do remember being up to his office now, but I sure

had forgotten it. I have seen Mr. Taggart before but I sure forgot where it was. I remember seeing him sitting down some place. I remember now testifying there.

Q. Do you remember whether or not the following questions were asked you and you gave the following answers in response thereto:

"Q. Do you remember whether the operation of the hatch-
[fol. 904] ery was successful or otherwise?
"A. I don't think it was, he didn't have a very good hatch, and the chickens that were hatched were rather weak."

A. I might have but don't remember it.

Q. Do you remember testifying:

"Q. The percentage of chicks to the eggs was very low, was it?
"A. Yes, sir."

Q. Do you remember testifying to that?

A. I might have but I sure don't remember it; I'll be dogoned if I do.

Q. (Counsel reading from Transcript of Depositions taken in 1925 regarding testimony of witness, L. W. Pitts):

"Q. And what chicks were hatched were not strong, healthy chicks, but were weak, unhealthy chicks?
"A. Yes, sir."

A. I might have but sure don't remember.

Q. Just look at this.

(Whereupon, counsel submits deposition of witness given in 1925 to witness for examination, same being a part of "Plaintiff's Exhibit 100".)

A. Who took this? Mr. Linebaugh?

Q. It is given in answer to questions by Mr. Linebaugh in September, 1925.

Mr. Ely: I show the witness Exhibit "100".

[fol. 905] A. Yes, I remember Fulsom.

Q. You don't deny that that is a correct reproduction of your testimony given at that time, do you? Just read it all. Read it to yourself.

(Whereupon, witness reads transcript of his testimony given by way of deposition in 1925, which is a part of "Plaintiff's Exhibit 100".)

A. I sure have forgotten about this. I remember when he was here all right. (After reading deposition.) That is about right. That is about the way I would have testified, so I guess——

Q. That is all.

A. That is all I know now. I know they hatched some chickens but what percent I don't know, but they did hatch chickens.

Deposition of C. T. Brewer

C. T. Brewer, was called as a witness on behalf of the defendants, and after being first duly sworn according to law, testified by deposition as follows, said deposition being offered and received in evidence:

Direct examination.

By Mr. Greer:

My name is C. T. Brewer; age, 65 and 11 months, and I live at 412 Callahan Street in the City of Muskogee. I have lived in Muskogee, Oklahoma, thirty-two years. I am not now employed; I am a retired Postal Clerk. I was form-[fol. 906] erly employed in the United States Post Office in Muskogee as General Delivery Clerk.

I have been interested in the business of raising chickens and hatching eggs in the poultry business generally for a good many years. We sold eggs for hatching and—I am sure I couldn't give you the dates, but for a good many years until recently, until—I will say, until twelve or thirteen years ago.

I know Milo Hastings. Well, Mr. Hastings built an incubator here and I don't know just how long that has been, quite a good time back, and I met him here, of course, and I had him hatch eggs.

Q. Do you remember what year that was? You say he built an incubator here. Do you remember what year that was?

A. Well, now, it has been quite awhile ago. I am sure I couldn't right offhand tell what year that was, probably 1910, '11 or '12, or somewhere like that.

I know where that incubator was situated. A little east and north of this place, I believe. I do not know the name

of the street it was on. I don't think it was on a street. It was between this next street here—what is that? Court? Well, between that and the next street back, I believe it was. I visited that hatchery a good many times. It was operated as a Commercial Hatchery. I don't know just how long it continued in operation—not so very long. I don't know whether it continued more than one season or not, I am sure.

I have somewhat of a vague recollection of the incubator used in that hatchery. I think Mr. Hastings built this along as he went, and I believe it was kind of in an "L" [fol. 907] shape as well as I recall, commencing this way (indicating from west to east), and running east, and running back south again, and he had his different departments cut off—departments or apartments or whatever you call it, of the incubator proper, where the eggs were put to hatch. Well, I am sure I don't know what its egg capacity was. Before he got through with it, it had quite a little capacity. I am sure I don't remember. It was large. I had never seen one as large as that before.

As well as I recollect, it operated by a Hot Air Blast. Well, I am sure—all—I could just describe my impression of it. At the west end of this first part of the "L" was a door, entrance there into kind of a hall or hatching chamber around there, and I remember the blast or machinery running there made it very difficult to talk or hear. On account of the noise. The air was heated. I believe it was done with gas; my impression of it. I saw it a good many times; we hatched off quite a lot—had him hatch for us quite a lot of eggs there.

I suppose we had as many as two (200) or three hundred (300) eggs hatched. By "we," of course, I mean my wife and I. I mean we would take eggs down there to be hatched, and I might add—I don't know if you want to know about it—we sold the Company eggs to be hatched, too, and we delivered them these once or twice a week. That is, in addition to the eggs we had hatched ourselves. We had in the neighborhood of 200 or 300 hatched ourselves. And then we sold in addition, eggs to the Company to hatch. The total of eggs which we turned over to this incubator to [fol. 908] be hatched, including the ones which we hatched ourselves and the ones we sold to them for hatching, well, I would think probably a thousand (1,000) or more; somewhere in that neighborhood.

As to the result of the eggs which we turned over to be hatched ourselves, well, we considered it fair results, good results, satisfactory. Well, I believe that they claimed that they would give a 70 or 75% hatch, and we had been hatching with hens, and, of course, we only had a small plant of our own, and we received along about that percentage of hatches. Somewhere about that—from 70 to 75% of the eggs which we turned over to them would be hatched chicks. I think we continued to patronize this incubator throughout the season of 1912. I think so. We didn't hatch any very late ourselves. We kept on selling eggs until about the close of the season I think.

I was in close touch with the poultry business and interests in and around Muskogee about that time. There seemed to be quite a good deal of interest among the people interested in the poultry business here in Muskogee in this incubator at that time.

I know other people brought eggs to the incubator to be hatched.

(Objected to as hearsay.)

There was a charge made for the hatching of these eggs by Mr. Hastings. As well as I can recollect it was one (.01¢) cent an egg. I am not very positive about that, but I think so. I think that is right.

Q. Please state what your opinion is, Mr. Brewer, as to [fol. 909] whether or not that incubator of Mr. Hastings was an operative machine or not?

Mr. Ely: I object to that as calling for an opinion. We were interested in facts.

Q. You understand, Mr. Brewer, in taking depositions of this kind, the lawyer has the right to make objections to any questions asked, and the Court later passes on it.

A. Yes, sir. Please state the question again.

Captain Greer: Read the question, please.

(Whereupon, last question above set out is red by Reporter as follows: Please state what your opinion is, Mr. Brewer, as to whether or not that incubator of Mr. Hastings was an operative machine or not.)

A. Yes, it was an "operating" or "operative" machine. I don't hear very well and I don't get all of those words.

Cross-examination.

By Mr. Ely:

I think Mr. Hastings operated this incubator and built it up as he went along. I think he did, yes, sir. That is, when he first started out in operation he only had a part of the incubator built, and then added parts afterwards. That is my recollection. As to how many compartments he started out with, I don't remember about that, I am sure. I remember when he first started out he only had a portion of [fol. 910] the compartments he finally had. Well, I think that is right.

I not only brought eggs in there to be hatched, but I also took eggs and sold them to him, and then he hatched the eggs himself. We sold them to the Company. I don't know who was the Company. We sold the eggs to him. He is the one who paid us for them. And in all we furnished this hatchery about 1,000 eggs. That is the best of my recollection, with what we had hatched ourselves. We had only 200 or 300 of that 1,000 eggs hatched. That is, we only got the product. We furnished the eggs to be hatched and the eggs which we sold about the same time, during the same season. We sold him the eggs after we finished hatching what we wanted. That is to say, my recollection is, of the 1,000 only 200 or 300 of these eggs were sent in to him for hatching for us. These chicks we got, these 75%, I was reckoning that on the 200 or 300. The eggs I carried for myself, somewhere about that, yes, sir. The kind of eggs we had were Rhode Island eggs. As to whether the chicks delivered to me by Hastings were the chickens hatched from those eggs, I am under the impression they were. You want me to tell why? Because we were handling some high priced chickens and we kept an eye on it closely. There were not so many Rhode Island Reds raised in this community at that time. That was kind of the commencement of the Rhode Island boom here in this town. But so far as I know, so far as my knowledge is concerned, the chickens we got from Mr. Hastings might have come from some eggs other than ours. Well, of course, they might have.

[fol. 911] Deposition of VAN D. CAMPBELL

VAN D. CAMPBELL, was called as a witness on behalf of the defendants, and after being first duly sworn, according to law, testified by deposition as follows, said deposition being offered and received in evidence:

Direct examination.

By Captain Greer:

My name is Van D. Campbell. I think I am forty-two and I live in Muskogee, Oklahoma, at 1051 York Street; born in '92. I am a carpenter; cabinet maker.

My wife runs the Marathon Hatchery and I help her quite often. My wife has been running this Marathon Hatchery for eight years, I think. I am familiar with the hatchery end of the business that my wife has been running. I set up the hatchery several times, and I set up Mrs. Hill's hatchery. I have installed incubators myself as a carpenter, too. I only have to do with the running of the Marathon Hatchery, only as a helper. My wife runs the hatchery. Sometimes when I am not busy I help her.

I do not know Mr. Milo Hastings. I know something as to an incubator or hatchery being operated in Muskogee, Oklahoma, during the year 1912 by Mr. Milo Hastings. We came down here from Kansas in 1911, moved off of a farm at Ottawa, Kansas, and we had eggs hatched there and that is how I happened to know about it. It was down on North 4th Street behind what was then known as the Hinton Theater. I had eggs hatched there. As to the re-[fol. 912] sult I obtained from the eggs which I had hatched there—well, it has been so long ago I don't just remember. We got chickens, but I don't remember just how many chickens we got. I know that it hatched chickens.

I saw the incubator in operation myself. It seemed to me that it was made out of a—it was a room converted into an incubator; was sort of a marvelous thing to people in those days, because seemed to me it was the very first one anybody ever walked inside of. You opened a door and walked right in and there were chickens and trays there of eggs. It was a brick floor, I think, and he had some kind of a circulating system, and he had chickens hatching

in there, thousands of them; an awful mass of eggs and chickens seemed to me when I was a boy; don't know how many there were but seemed like a lot of them.

The incubator my wife operates at the Marathon Hatchery is a Buckeye No. 7. The size of the Hastings Incubator in comparison with this Buckeye No. 7—well, I imagine—of course you can't tell—incubators nowadays have eggs more compactly arranged. Seemed to me he had great big trays but the room was about as big as this room right here; maybe not quite as big. I would estimate the size of this room about fourteen (14 x 20) by twenty.

I saw the incubator in operation several times. It must have been 1912 because we came here in August, 1911, and that was too late to hatch chickens and we hatched chickens the next year. I paid for having those chickens hatched. They were all our eggs that we had custom [fol. 913] hatched. They were Rhode Island eggs I suppose. That is the only kind we had on the farm.

I do not recall what kind of circulation that was in the incubator. Was a terrible roar in there. I know it had some kind of fans. Seemed most trouble with Hastings was mixing up his chickens. Most people complained of taking Rhode Island Red eggs there and getting Barred Rock chickens, and vice versa. I mean that was the current talk. He was all head over heels in his invention and he forgot about the business end of it. Don't think he ever made it pay.

(Objected to as speculative.)

My trade was that of a carpenter. From my experience as a carpenter, and my knowledge of the incubator business in connection with that one operated by my wife in which I help, I think this incubator was a success for those days. It hatched chickens, undoubtedly.

Cross-examination.

By Mr. Ely:

When I say "we" hatched eggs, and "we" paid for the eggs, and "we" paid for the hatching, I mean just three of us. Me and my father and mother. I always lived with them before I got married. I suppose those were my parents' eggs taken down there. I must have been about

twenty then. My parents are still living. My parents live here in Muskogee. We have always lived together.

Mr. Ely: I object to the testimony of the witness on the additional ground that obviously he is not the one most familiar with the operations described.

(It was stipulated by and between counsel that Messrs. [fol. 914] Greer, Taggart and Ely visited, during the recess, the farm of Mr. Hastain, and there inspected the Blower which is shown in "Defendants' Exhibits 22-B to F", inclusive; that the Blower bears the mark "made by the American Blower Company, of Detroit, Michigan", and is a No. Two and one-half (2½) Blower, as marked thereon; stands about thirty-four (34) inches high; the intake opening at the center is fifteen (15) inches in the inner diameter at the outside of the housing, tapering to approximately twelve and three-quarters (12¾) inches in diameter immediately adjacent to the rotor; the outlet opening is eleven and one half (11½) inches in the inner diameter, and twelve (12) inches in the outer diameter.)

Deposition of L. A. Cory

L. A. Cory, was called as a witness on behalf of plaintiff in rebuttal, and having been duly sworn according to law, testified by deposition as follows, said deposition having been offered and received in evidence.

Direct examination.

By Mr. Ely:

My name is L. A. Cory. I am sixty-one years old and live at 810 Elgin, Muskogee. My present occupation is C. W. A. Time Keeper.

I was interested at one time in poultry in and around [fol. 915] Muskogee. I had fifty (50) to one hundred (100) fowls at a time for years; sometimes more. As to the kind of chickens, they were Buff Cochins. I operated this chicken industry from 1900 continuously up until approximately 1930, not always the same breed of chickens, but then I had chickens all that time. During the year 1912 I

had Buff Cochin chickens; from three to four dozen hens, I couldn't say the exact number, forty or fifty.

I was here in Muskogee at the time Milo Hastings had an incubator here. I was reasonably acquainted with Milo Hastings at the time. As to how I became acquainted with him, it became common knowledge that he had a big incubator here and that was a novelty, and I was interested in chickens, and I went to the incubator there and saw the incubator, and saw Mr. Hastings and became acquainted with him. At that time I was a member of the Poultry Association known as the "Muskogee Poultry Association". I took some eggs down to Mr. Hastings' place to be hatched, several times. I can't remember exactly how many times, possibly as many as three and probably more times than that. I took down there one hundred (100) or more eggs at a time. I secured no result; no chicks. Three or four different times and got approximately no chickens at any time. I don't believe Hastings gave me any excuse, any more than he said they didn't hatch; don't remember any other reason.

I was hatching eggs from the same flock at the same time, and selling eggs. From the eggs I hatched I got, oh, fair hatch, sometimes three-fourths hatch and sometimes 50%. [fol. 916] So far as I know, there was no reason why my eggs wouldn't hatch, that is, there was not anything attributable to the eggs. I think not. The same eggs which I took to the hatchery, those eggs hatched for other people. Yes, sir, fairly so. Yes, I had complaints from other people as to my eggs, but no complete failure except the eggs I took to Mr. Hastings. I had fair results, or what I would say was fair results, from the eggs which I took to hatch elsewhere.

As to what the sentiment was, as far as the Poultry Association was concerned, towards the Hastings Hatchery, the members of the Association were all friendly to it; were glad to see the hatchery come in here; don't know as the Association ever went on record any way. They didn't buck Hastings. There was not any objection to it as to the Association or as to the members. They would have been glad to see Hastings operate it, if it had been successful, for the reason that it was an easy way to have our eggs hatched, while, as far as I know, there wasn't anybody here sold day-old chickens up to that time, but easier than hatch-

ing under hens, and simplified our problem, and could get out chickens earlier than hatching under hens. They would have been very glad if the Hastings proposition would have been a success. His price might have influenced it, but they would have been glad to have the hatchery here. Yes, sir, I am sure they were. It would have been a big thing for Muskogee.

Cross-examination.

By Captain Greer:

As to how many times I visited this hatchery of Mr. Hastings—well, now, of course it has been a good many [fol. 917] years, I couldn't tell, I worked in a plumbing shop that I had to go by there to go to work, and I suppose I have been by there twenty-five times. That is, of course, just an estimate. Not in the inside of the hatchery. No, possibly not. In the room where it was though. I went on the inside of the hatchery a few times. I saw it then in actual operation. I can't tell from memory how long it continued to operate. I don't know. Well, it is my opinion that it operated throughout the whole hatching season of 1912. I can remember the circumstance of Milo Hastings leaving, but when it was, I can't remember.

I knew that Judge John Lieber was interested in the incubator too, and also a Mr. Hastain.

Q. And didn't they operate it the next year after Mr. Milo Hastings left? Didn't Mr. Hastain operate the incubator also?

A. I am reasonably sure he did, although I wasn't in it at the time he operated it.

As to what particular attention I paid to the breeding of the hens from which I procured these eggs which I took to Mr. Hastings, well, I considered myself a good breeder and had for a number of years this particular strain of chickens. They were Buff Cochins. I did say I received complaints from others to whom I sold eggs, as to the eggs not hatching in some instances, but never as to a complete failure. I never got any results at all from the eggs which I took to Mr. Hastings. Not a chicken. That is the reason it was

impressed on my mind. At that time I thought some of those eggs hatched.

I heard that Mr. Hastings was operating sort of a breeder or place where he was raising chickens a little north of Mus-
[fol. 918] kogee. I don't know that. I heard it though. At the time it wasn't my idea that Mr. Hastings hatched some of my own eggs and took them and put them out on this farm, but I might have thought it the next year afterwards after hearing talk. I did hear such talk as that: That he would take eggs in and tell the people that brought them in that they didn't hatch, and then he would hatch those eggs and take them out on his farm. I heard the talk.

The price Mr. Hastings charged for hatching these eggs was one (.01¢) sent an egg when you put them in. I would judge the hatchery was pretty well patronized by people interested in the poultry industry at that time, and created a good deal of interest among people who were interested in the poultry industry here. I knew Mr. Hastings personally.

I did not see this incubator in operation the next season, hatching season of 1913 at all when Mr. Hastain was running it. It is my recollection I was never there after Mr. Milo Hastings left.

When I took these eggs down, I saw chickens in his brooder room there. He had a stove pipe for a brooder. I presume for that. I never saw him taking any chicks out of the incubator.

I know Mr. C. T. Brewer fairly well. I never saw him bring any eggs there to be hatched.

Outside of this experience with the Hastings Incubator, I never had any eggs hatched in any other incubator right then. Late years I have had Hogan hatch for me. Well, I had reasonably good success there, 70 or 75% probably. Later on I had a small incubator at home and generally hatched my own chickens. I had Hogan hatch for me, well, [fol. 919] probably the spring of '92, last time. —'32. I said '92.

Redirect examination.

By Mr. Ely:

I am not really sure that Mr. Hogan runs a Smith Incubator. I saw the incubators, but I don't know.

Deposition of RICHARD SHANAFELT, Tuesday, Feb. 27, 1934

RICHARD SHANAFELT, was called as a witness on behalf of plaintiff in rebuttal, and after being first duly sworn according to law, testified by deposition as follows, said deposition being offered and admitted in evidence:

Direct examination.

By Mr. Ely:

My name is Richard Shanafelt, commonly known as "Dick" Shanafelt. Park Hill, Oklahoma, is my address. My age is fifty-four and my present occupation is hard to define. I live on a farm but I don't actually do farming myself. I moved on a farm and started a little fruit farm and poultry and one thing and another like that.

I came to Muskogee January 2, 1907; lived here until June of 1931. I remember the construction in Muskogee of a hatchery run by Milo Hastings and Mr. Lieber. I was interested in poultry raising at that time. I raised at that [fol. 920] time principally Black Orpingtons. I specialized in Black Orpingtons. That was a standard breed of chicks at that time. I had been successful on an original scale in raising my Orpingtons, not a large breeder, but kept a flock, say, from seventy-five to one hundred. The best in the United States, you might add.

I became a customer of the Hastings Hatchery. I took eggs there—couldn't state exactly how soon after he opened, but it was almost immediately after his starting the new hatchery, to the best of my knowledge. I took eggs there to be hatched. To the best of my memory at this time about 200 eggs; might have been a few less or a few more, but I believe that will practically get the number. If I remember, it was about that. I got a very poor hatch. As to just how poor, I have been thinking that over and it may have been five or six or, possibly seven, but I am sure not more than that; may have been a few less. Just a very small—practically nothing as far as results. My eggs proved fertile under other conditions at that time. If I am not mistaken, I set other settings of eggs under hens from that time on and very shortly afterwards I got an incubator, a 300-egg incubator of my own and had fair results with subse-

quent hatchings about that time. I did not get poor results as I did with Hastings. No, sir, I had a vigorous, good bunch of chickens, unusually so. I wish I had them now. I did not take any subsequent hatchings to the Hastings Hatchery. No, just the once, because it was generally considered a failure and most of the breeders here considered it a poor hatch. If you will permit me to say, that was in [fol. 921] answer to the question as to why I did not take more there. As a result of my own experience.

I was a member of the Poultry Association here in Muskogee. I joined when they first started the Muskogee County Poultry Association.

As to the sentiment toward the Hastings Hatchery at that time it first started, the feeling among the breeders, I was in very close touch with them. They were very glad to see the Hastings Hatchery come here and on very friendly terms with it; wanted it to be successful because it meant a greater poultry industry in this community and therefore greater sales. The concensus of opinion after Hastings had been running here a while was one of disappointment. That, as I say, nothing but a friendly feeling existed, and very much disappointed that they considered it a failure.

I knew Mr. S. J. Anderson, who was at one time Secretary of the Association here, quite well. He died, I believe about six years ago; possibly longer.

I saw some of the mechanical features of this Hastings Hatchery, particularly the fan that was used. As to the sort of a fan that I saw in there—I am not very clear, but to the best of my memory it was something similar to something, say, about a fourteen inch electric desk fan, as you will see today; used also in fans outside; and I believe it was stationary, and to the best of my memory it was a fan of that nature set in there for the purpose of circulating the air, or something. I never have been an Incubator Expert, but it [fol. 922] was something of that principle.

Q. Would you recognize a picture of that fan if I showed it to you, Mr. Shanafelt? You think you remember it well enough?

A. I am not right sure.

I am shown "Defendants' Exhibit No. 25", or a blue print, rather, of "Defendants' Exhibit 25", and my attention is called to Figure 2 and the fan shown in that picture

and asked if that resembles the fan that I saw. The scale is so small and of course the arrangement is not clear. It was something of that nature but I am not sure whether that is as it was right at that time when I was in there or different. Of course I can describe the arrangement of the shed and everything he had in it. That fan is the type of what you call a "rotary desk fan". That is what I thought it was at that time, to the best of my memory, but that has been so many years ago and until recently my attention not being called to it. I stopped and studied over it and just recall the location of it and the general principle, and while, as I say, I may be mistaken, I was under the impression that he had something like an ordinary desk fan, one of these fourteen inch fans, but I don't want to call the set-up of it right at that time. I wouldn't want to be positive. I like to be fair on those things.

I received prizes for my breeding chickens in my flock. I was quite successful on my breeding. I took a great interest in it and mated as I thought properly and had great success at showings and have been advised by a Judge who judged in Madison Square Garden in New York and the Kansas City Coliseum that I had as good a flock of Black [fol. 923] Orpingtons as there were in the United States, and was advised to exhibit in those cities. It was in this same flock from which I took eggs to Mr. Hastings to hatch. I have some clippings I just happened to put in my pocket if there was any question as to my flock. I have some contemporaneous with these events. I think right about that time; before and after. Here is one, February 1, 1912. I think that was the result of a State Poultry Show, which was also an official A. P. A. Show. That was held here in Muskogee. That was held in January, 1912. It is a very poor write-up, but—You wish me to read it?

(Whereupon, witness reads from newspaper clipping, which is later marked for identification as "Plaintiff's Exhibit 101", as follows):

"It is a proven fact that in Mr. Richard Shanafelt, Muskogee has the best breeder of single comb Black Orpingtons in Oklahoma if not in the Southwest.

"At the Muskogee State Fair he won every first prize and sweepstakes, a silver loving cup and specials over all competitors in his breed. Then later at the Texas State

Fair held at Dallas, he won the most coveted prize in his breed, namely, first pen, over Orpington exhibitors from New Jersey to California. Then at the recent State Poultry Show held in this city Mr. Shanafelt won over the best pens of Black Orpingtons that have heretofore been shown [fol. 924] in the state, and over individual birds which have never been defeated until meeting Mr. Shanafelt's Black Orpingtons, at this show.

That was taken from the Muskogee County Republican under date of February 1, 1912. I didn't write this article that appeared in the paper. No, sir, I would have had a good one if I had written it.

Here is one I took because it is preceding that. This is taken from the Muskogee Daily Phoenix dated October 10, 1911. That is reports of the Eastern Oklahoma State Fair wherein they used to have a very large and good display of poultry. Among the poultry awards it gives here:

(Whereupon, witness reads from newspaper clipping as follows:)

"R. Shanafelt won everything in the Black Orpington class, capturing first cock, second cockerel, third cockerel, first and second hen, and first, second and third pullets. He also captured the $10.00 special for best cockerel in this line, also a special silver loving cup."

That is the same flock I furnished to the Hastings Hatchery. Then I have one of the later ones. This is a clipping from the Muskogee Times Democrat dated February 5, 1914. If I am not mistaken, that was also a State Poultry Show. It was labeled: "Eastern Oklahoma Agricultural Association, in the Scales Building," but I am positive that [fol. 925] was an official State Poultry Show for Oklahoma. Under the awards of the State Poultry Show given at that time, under "Black Orpingtons" (Reading from clipping):

"Richard Shanafelt, city, clean sweep of all premiums in this class."

That is the only reference. That gives all the poultry awards at that time of the various breeders and the reference to me.

(Counsel for the plaintiff then offered in evidence as "Plaintiff's Exhibit 101", photostatic copies of these clippings read by the witness.)

Muskogee was the center of a considerable poultry raising industry at that time. It was a very enthusiastic group of poultry breeders.

I knew a Mr. Cory, Mr. L. A. Cory here. He was a breeder of Buff Plymouth Rocks and Buff Orpingtons. And I also knew a Mr. L. W. Pitts who was a breeder. I think he is mentioned in one of those articles. He bred Single Comb White Leghorns. And S. J. Anderson is also mentioned, and also a Mr. S. J. Ward. I remember Mr. S. J. Ward, Sam Ward. I am not sure what was his specialty. According to the paper it was White Leghorns, but I don't recall, because he was not quite as active a competitor as many of the boys. Mr. Ward was known around Muskogee. I know who he was. At that time, if my memory don't escape me, he was an employee in the Muskogee Seed House, of which Ross Binding was Manager. I think [fol. 926] he still runs a string of seed houses through this country, known as the Binding-Stevens Seed Company at this time, with headquarters at Tulsa. I am referring to Mr. Binding, but S. J. Ward worked for him at that time here in Muskogee.

Cross-examination.

By Captain Greer:

I was raising both Prize and Utility chickens. I had a happy blending of the two. I do not think it a fact that with Prize Show Chickens the eggs from that class of chicken, as a rule, are less fertile than those of ordinary chickens, not when properly bred. Occasionally you will retain an unusually fine exhibition bird that may not have the fertility that the majority of your flock has, but I didn't make it a point to have strictly exhibition stuff and not utility. I got a very high percentage of eggs, in fact, at that time in comparison with some White Leghorn Breeders and others. I got a greater percentage of eggs than they did, just on two or three occasions in various sorts of weather when I made comparison with them. I had a fine egg producing bunch, unusually fine. As I say, I wish I had them now. I am speaking of fertility because I got results. Before I took these eggs to Mr. Hastings for hatching I hatched under hens and also—I can recall one other time I took some eggs to an individual, and that was Lewis Pitts that we have referred to. He had an incubator

there and at one time he had space there and he hatched a batch for me. The kind of an incubator he used was one [fol. 927] of—one of the old most favorite—old wooden incubator. Don't believe I can name it. No, I don't believe it was a Cyphers.

I am not sure what year it was I took to the Hastings Incubator and then I hatched out quite a bunch myself because I generally had ten or fifteen hens I was setting that I would hatch and out of that I would generally get a hundred or more chicks, very frequently have a hundred and fifty chicks, and would cull them down and get my flock from those, and very shortly after that I believe it was I bought me a metal incubator manufactured in Tulsa, called the Blue Ribbon.

I can't recall how many I took to Mr. Pitts to hatch for me. I would guess something around seventy-five or possibly a hundred. I just took one batch to him. I didn't take any more to him because if I could get me twelve or thirteen chickens out of a setting of fifteen eggs, and had, say, ten or fifteen or twenty hens, and the space there, I didn't have any occasion to take them. I recall I got a pretty fair hatch from this batch I took to Mr. Pitts for hatching, say, seventy-five chickens out of one hundred eggs. I believe it was along when it was quite cold or something of that kind and I think he remarked at the time he had let them get chilled or something. I just have a faint remembrance that I was pleased with the results I got with the way he had reported.

I had never seen an incubator of the size of this Hastings Incubator at the time I took this batch to him. That was [fol. 928] going to be quite a wonderful thing for this City. According to my recollection, it was about two hundred eggs that I took to Mr. Hastings to hatch for me, and that was shortly after he opened up for business. He was conducting a regular Commercial Hatchery. It must have been early in January of 1912. That would be the best of my recollection, I am quite sure.

I went into the Hastings Incubator and looked at it. That was where I saw this fan arrangement that I spoke of. As to its being just a similar sort of a fan as the exhaust fan that you see in a movie house, for instance, I can't recall it that way. My memory is not right clear on it but I was under the impression that when it was set up—forget whether it had some sort of funnel for the fan or the fan

was setting up on a shelf, to circulate the air. The machine was in actual operation when I saw it there. I don't know whether it was hatching chicks or whether it had. Mine may have been one of the first batches put in. I know it was right in its infancy, when it first opened up that the various breeders decided to put some in to see what it would do, and we were anxious to help him get started and going. I know that he did actually hatch chicks in that incubator, regardless of the percentage of the hatch. I am sure, at that time, I got—seems to me it was two or three chickens out of my batch that were white chickens and I was breeding black chickens. I know it hatched some chickens. In other words, it may have been there was something wrong with the handling of the eggs, so that when you went to get the chicks which had been hatched, you got chicks [fol. 929] of a different breed from the eggs you left with Mr. Hastings to be hatched, I wouldn't say. I know there was something wrong with it. I don't know what it was. I am not an Incubator Expert.

Q. Well, you don't think it would be possible for an incubator to change the breed of the eggs?

A. It is true. Of course, I forgave him for it. I knew it was just one of those unfortunate occurrences.

Q. That would go to the handling of the eggs by the man operating the incubator, and not the operation of the incubator itself?

A. Yes, I tried to locate my missing chicks but I know I couldn't find them.

Q. And that was pretty commonly the rumor and belief around here about the way that the Hastings Incubator was handled? That you would put in eggs of one breed and get out chicks of another breed?

A. Yes. Of course I held sort of a lenient feeling toward him at the time and thought he rather regretted handing back such a small amount of chicks, and so put in a few extras. That was just my surmise.

Q. Do you know whether or not Mr. Hastings was raising chicks, or a breeder, out on a farm at the same time?

A. He didn't have the reputation of being a breeder; may have just started something of that kind. If he did that was an arrangement that most of the boys didn't know about.

Q. That machine was operated throughout the hatching season of 1912, wasn't it?

A. I am pretty sure it was.

Q. And do you know when Mr. Hastings left Muskogee?

[fol. 930] A. I am not clear on it. It seems to me—May I speak on the side on it? It seems to me he ran that awhile, and finally ran that awhile, and decided to leave, and Ed Hastain tried to take it over awhile and see if he couldn't operate it awhile.

Q. And he ran it awhile?

A. And then I think it was abandoned as a success and he decided to abandon it because it couldn't be run as a success or something of that sort.

Q. You are merely expressing your opinion as to why it was abandoned?

A. Just hearsay and common talk among the poultry breeders. Naturally we kept in close touch with things. We had regular meetings; I believe we had regular weekly meetings at that time. I am not positive but I think we did.

Q. It would be possible, wouldn't it, Mr. Shanafelt, that it would be abandoned because it did not make a financial success, regardless of whether or not the machine was practical?

A. That may be true, that it was found to be not a financial success, but I am positive that was the consensus of opinion among the breeders, that they could not get it to running successfully in order to get the eggs in and in order to make it a success.

Q. At any rate, your experience with the machine was only the one attempt to have your eggs hatched, and that was at the time when this fan was in this incubator?

A. Once was enough until I learned it was successful and I felt assured of getting a reasonable hatch, and I never found that to be the case, and therefore put no more eggs in there.

[fol. 931] Q. You never tried it but this one time yourself?

A. No, but was in constant touch with the situation, but not the actual operation of it.

I know Mr. C. T. Brewer, who used to be General Delivery Clerk at the Post Office.

I have a recollection of his breeding poultry sometime back, but I am not clear now just of the time. There were quite a few who stood out above the others who took a

greater or more active interest in the meetings and organization work and all of that. There were a few breeders in there who had pens and sold chickens but did not enter into it as enthusiastically as others, and there are a few of those whom I have forgotten.

I could not state with any positiveness what charge was made for the eggs which I took there to be hatched. But there was a charge made. In other words, it was run as a commercial enterprise.

I know that several poultry men in this community visited the incubator to see it in operation, and I feel sure that practically all of them did. Naturally it created quite a—you might say, excitement—don't know what you would call it—friendly feeling and enthusiastic feeling and they were glad to see it come and locate here and all wanted to see it.

I never set any eggs with Mr. Hogan. I have met him but wouldn't know him if I met him on the street. Mr. Hogan, if he was a breeder at that time, was not an active member of our Association in that period. Of course I know of him now by hearsay on account of him having been in the incubation business. I have not raised any real good [fol. 932] class of chickens since that time.

I was in the Indian Title Research Work, my business being all before the Federal Government or Department, and my work became very slack at that time and I was going behind financially instead of ahead, and I procured a little farm out in Cherokee County.

I am not actively raising chickens now, only a small flock and I was unsuccessful in getting a good bunch of chickens.

Deposition of Samuel J. Ward

Samuel James Ward, witness, being duly sworn and examined on behalf of plaintiff, testified at New Orleans, La., March 1, 1934, by deposition as follows, said deposition being offered and received in evidence.

Direct examination.

By Mr. Ely:

My name is Samuel James Ward. My residence is 627 Lansin Street, Tulsa, Okla. My age is fifty-three years. I

am now District Manager for the Emerol Manufacturing Company. And I am now in New Orleans on business for the company.

I used to live in Muskogee, Okla. I lived there during the years from 1911 to 1913. I was with the Binding Stevens Seed Company at that time. They were selling seeds, poultry feeds, incubators and supplies. I personally [fol. 933] had to do with the selling of incubators for this company.

I would say that Muskogee was the largest poultry center in that part of the country at that time. I recall an incubator erected in Muskogee about that time known as the Hastings Hatcheries. I know Mr. Hastings. I was in Mr. Hastings place of business where he had the incubators several times. The first time I was in there was a short time after he had completed it, and had run, I would say, his first hatch. I believe that was the first time I was in there. I was in there, you might say, a month from then, and then again in another month, maybe a month apart, three weeks or a month, something like that. Mr. Hastings did not send for me. The occasion of my being over there on my various visits was naturally being interested in incubators, I went up to see his plant. Mr. Hastings did not discuss with me the operation of the incubator—not going into details.

I did have a conversation with Mr. Hastings on one of these visits. The first one. He asked me why he could not get the incubator to work properly. I told him I did not know why it did not work. I was not familiar with large incubators. The only ones that I had knowledge of were the small types, and that I could not tell him, unless there might be some fumes maybe from some paper or something he had the outside walls lined with.

I know what sort of results Hastings got with this incubator. I came to know or learn this mostly from people who had hatches in there that I called on, and sold our sup- [fol. 934.] plies. I sold them incubators and supplies. The reports I got concerning the Hastings' hatches were that the first hatches he got, he did not get over from 5 to 20 per cent. of the fertile egg hatches. In those days we counted fertile eggs to get a percentage, which were candled afterwards. At first he got from 5 to 20 per cent. He remodelled the incubator. After he remodelled it, he got better hatches, but at no time did he get over a 50 per cent. hatch.

From my conversations with these poultry raisers around Muskogee, as to what their reaction was to the Hastings incubator, I learned that they would not give him any eggs to hatch, on account of the poor hatches they were getting. This feeling for the Hastings incubator affected my business in selling incubators by helping us to sell them. I sold incubators in that territory at that time. It was either in 1912 or 1913 that we shipped a straight carload of incubators in at one time. That would probably give you an idea of what we were doing with incubators. This carload was of the Mandy Lee, also Old Trusty and Petalouma. As to what sort of hatches we were getting out of these incubators, I would say from 75 to 90 per cent. of fertile eggs.

I saw some of the mechanism that was in the Hastings incubator, particularly fans. The kind of a fan that I saw was an ordinary circulating fan that is used in restaurants for drawing the heat away from over the ranges. I never saw any other type of fan in this incubator on any of my trips. I had seen a fan or fans in various locations in the [fol. 935] incubator. The first time I saw it, it was towards the back, up I would say three feet from the ceiling. The next time I saw it lower down, closer to the floor. I did not see any means of ventilation.

Cross-examination.

By Mr. Greer:

I work now for the Emerol Manufacturing Comapny. They manufacture a special breaking oil, top cylinder lubricating oil, a penetrating oil, and a top cylinder lubricating oil. My particular work with that company is District Manager.

As well as I can remember it was in 1914 when I left Muskogee. This Hastings incubator was not in operation there when I left. The Hastings Hatchery was in operation in Muskogee, to the best of my memory it was in 1911-1912, through two seasons, through two hatching seasons. In that section of the country the hatching season runs from approximately the first of the year to around the latter part of May or June. My best recollection is that this was in operation during the hatching season of 1911 and of 1912. Back that long I cannot give you the exact date. I think it was operated through two seasons. I do not think

Mr. Hastings was there the second season. I cannot recall the name of the person who operated it this second season. It was some attorney in Muskogee and another party were operating it then.

The first few months of the first season the Hastings Hatchery had quite a number of patrons. Later on they did not get any. I saw the incubator at that time. And at [fol. 936] that time it was operated with a fan for the circulation of the air, such as used in an ordinary restaurant.

I am asked to look at Defendants' Exhibit No. 25 in this case, Fig. 2 on Defendants' Exhibit 25, and state, if I can, what that Fig. 2 represents. (Counsel shows witness exhibit referred to and witness examines same.) It is a picture of a circulating fan. That is the character of fan which I saw in the Hastings incubator in Muskogee, and I never saw any other type or character of fan in it there. I believe it was covered. They had to open a door to see the fan itself.

As to the doors being arranged in that incubator so as to let in fresh air also, and likewise to let out foul air, from the outside, I didn't see any doors. If you were to open these doors that enter into the compartment where the fan was, that would not necessarily let in some fresh air. The doors were in the incubator itself. There were doors into a kind of an air take with the fan set in. You get into a door into the incubator, and then you had to open another one to see the fan in operation, to the best of my memory. If you were to leave both of those doors open, you could see from the outside then. Fresh air could get through those open doors, if they left the outside door open.

That air was heated. The arrangement for heating the air was a gas heater, to the best of my memory. A pipe coming from the gas heater went behind the fan, the air blew over these heated pipes. These heated pipes were at the same end of the incubator as the fan was at that time. I am positive of that. I am not sure whether there was any [fol. 937] exhaust pipe from those heated pipes that went out of the incubator or not, but I am positive they were in the same end of the incubator that the fan was in at every visit I was there. Mr. Hastings remodelled the incubator once that I know of. That remodelling consisted of changing the position of the fan, from the ceiling down lower.

There was no arrangement for maintaining moisture in the air in the incubator, none that I saw. No pan was there containing water at all. I am asked again to look at Defendants' Exhibit 25, and tell whether or not, according to my recollection, that is a correct picture of the operation of the Hastings incubator showing the fan. I believe it is. There was a pan right under that fan to contain water, and that pan is shown in that picture. I never saw any water in the pan. There was a pan there. I never saw any water in it.

I spoke of some fumes on account of paper lining the walls. I referred to the outside walls of the incubator, which were all lined with a kind of tar or creosote paper on the outside of the incubator. On the outside of the incubator. By the outside I do not mean the compartment where the eggs are. It was just as an insulation to keep the heat in, on the outside of the incubator. This paper was against the wall of the building, I mean. That building was located in Muskogee, to the rear and side of what was then known as the Hinton Theatre.

I do not remember Mr. Norman B. Hickox. I knew a Mr. Peabody with the Peabody Electric Company in Muskogee. I never saw him around that incubator at all.

[fol. 938] Mr. Hastings had some assistants, but just who they were I do not know. He supervised the building and construction of it. As to doing all the manual labor, I do not know whether he did it or not. I stated that after he remodelled it he got better hatches than he did at the first hatch he had, but never did get better than a 50 per cent. hatch. I know of no individual instance where he got a 50 per cent. hatch.

I know a Mr. C. T. Brewer in Muskogee. I do not remember any direct talk with him about the hatches he got from that incubator. I may have; I would not say yes or no. The names of some of them that I did talk with from whom I gained this information that after the remodelling he obtained better hatches, but never did get more than a 50 per cent. hatch, are: L. A. Corey, Richard Shanafelt, named Dick; those two, and H. M. Chestnut, I believe was another one. That is all I can think of right now. Their patronage of this incubator was while this exhaust fan, such as I have described, and is shown in Defendants' Exhibit 25, was being operated in the incubator.

I cannot recall the manufacturer's name right now who manufactured the Mandy Lee incubator which I sold. It was a standard make of incubator sold all over the country at that time. I do not know who the manufacturers of Old Trusty and Petalouma incubators are, or were at that time. No. I cannot give you the exact names on that.

The egg capacity of the Mandy Lee incubator was from 100 to 350 eggs capacity. The Old Trusty, I don't think [fol. 939] we had anything over 150. I think we had one or two 300 eggs capacity machines. They were incubators of small egg capacity. To the best of my recollection the egg capacity of the Hastings incubator was supposed to hold about 25,000 eggs. It was divided by partitions and there were slots that the trays slid in, and held the eggs in different positions, one above the other. I cannot remember the exact number of trays that were in each partition. There might have been as many as ten or twelve, and there might not have been more than eight. There might have been as many as 20 trays in each compartment.

I am positive that from my visits to this plant where Mr. Hastings was operating, that the thing was actually in operation and did hatch eggs, regardless of the percentage of the hatches. Yes, sir. And that was throughout the hatching season of the two seasons that I remember, and I think it was in 1911 and 1912.

You determine the fertility of the eggs by candling them after they have been set a week or ten days. It is an infallible test if a man knows what he is doing. I saw these eggs that were placed in the Hastings incubator tested for their fertility. They tested them there. Mr. Hastings did it. I saw him test them. I never placed any eggs in that incubator to be hatched myself. As far as my recollection goes, the only remodelling of the incubator of Mr. Hastings was the changing of the location of the fan from the ceiling to the floor. It was the same kind of fan that was used though.

I severed my connection with the Binding Stevens Steel Company, to the best of my recollection, in February, 1914. [fol. 940] I have had no experience with incubators since then. I am not an incubator specialist. What I can do would be to set them up and start them out for the customer. I had never seen an incubator of the capacity of this one prior to my visits to the Hastings incubator.

Redirect examination.

By Mr. Ely:

I operated incubators at that time myself. I raised chickens at that time and ran incubators. I received reports from people to whom I sold our incubators as to the percentage hatched of fertile eggs. They got from 75 to 90 per cent. hatch. A hatch of 50 per cent. or less would not be a successful hatch. If I did not have successful hatches in our incubators I sold, I would have soon heard about it. Absolutely.

Deposition of Joseph Taggart

Joseph I. Taggart, Witness, being duly sworn and examined on behalf of plaintiff, testified by deposition as follows, said deposition being offered and received in evidence.

Direct examination.

By Mr. Ely:

My name is Joseph I. Taggart. I have already testified in this case. During the recess in the taking of the testimony in Muskogee on Monday the 26th of February, I went in company with Mr. Greer and Mr. Ely to a farm close to Muskogee to look at this blower that is shown in Exhibits 22-B to F, inclusive, those photographs. I was told it was [fol. 941] a farm belonging to Ed Hastain. We examined that blower that was out there that was alleged to have been the one that was used in the Hastings incubator.

I was present during the deposition of Mr. Hastings, taken in New York some time ago in this cause. I recall that at page 33 of the record Mr. Hastings said, referring to this alleged fan they were supposed to have had in the Hastings incubator: "The size of the fan or blower indicated in these drawings was that of a Sirocco blower with an 8" outlet." That was on page 33. And on page 80 in the direct examination, still Mr. Hastings testifying, he testified, as I recall: "That was a standard 8" blower—8" outlet." And again on re-direct examination, on page 147, Mr. Hastings testified: "None of these drawings are exactly to scale and my testimony as to the size of the blower and

its make is exactly—an 8" outlet Sirocco blower standard at that time." I recall that testimony.

The three of us measured the outlet opening of that blower. It was a blower manufactured by the American Blower Company, combining what is know- as the Sirocco wheel. It had an outlet opening that was 11½ inches inside dimensions, and would take a 12 inch exhaust pipe to fit over it.

Q. Therefore it was not the same blower that Mr. Hastings testified he used there in Muskogee, was it?

A. It was over twice as large as the one Mr. Hastings referred to. That is, I mean the area of the outlet was more than twice as large.

There were some questions directed to Mr. Lieber at the time he was on the stand there in Muskogee in my presence, [fol. 942] about my negotiations with him for the purchase of this blower. I did have some negotiations with Mr. Lieber on this matter, in the spring of—in April, 1926. It was after the Stone case and the Cooley case, and it was also after the Wolfe case. In all of these three cases which I have referred to, this alleged Hastings prior use had been thoroughly gone over by the defendants. I was not present at the Wolfe case, and I only know about that from the record.

As to my purpose in entering into this negotiation with Mr. Lieber, and what I had in mind—at that time I had been requested to get together duplicates on reconstructions of early methods of incubation for the purpose of studying them, and with that idea in view I wrote to Leiber asking him if the equipment which he told me about he had, if he would sell it, and I offered him $50.00 if he would send me the blower and trays which he had told me were a part of the original Hastings incubator. He replied that the blower or trays had no intrinsic value, but that to him they were worth $5,000.

I first saw this blower in August, 1926. It was after these negotiations I have been talking about. I then measured the outlet of the blower when I saw it in August, 1926, and it was the same as it is now, 12 inches outside diameter. Mr. Hastings testified in the Cooley case that it was an 8 inch outlet blower that he used at Muskogee.

Cross-examination.

By Mr. Greer:

In my negotiations with Mr. Leiber in reference to this blower, in addition to his stating that it was worth $5,000 [fol. 943] to me, I think Mr. Lieber made the stipulation that he did not want it destroyed. My negotiations came to nothing, I did not buy the blower. After I saw the attitude that he took in the matter, we did not pay any further attention to it.

The inside dimension of this blower at Muskogee was 11½ inches. I stated that Mr. Hastings had described that outlet opening as an 8 inch opening.

Taking Mr. Hastings' testimony, I have stated that his testimony was that it was an 8 inch opening, and then I stated that the area of the outlet was twice as large as that of Mr. Hastings. It is more than twice as large. An 8 inch outlet has a certain number of square inches of area, and 11½ inch outlet has over twice the number of square inches of area.

It was April 14, 1926, that I opened these negotiations with Mr. Lieber for that blower. My interest in buying it was based upon the assumption that it had been used in the Hastings' incubator in 1912 and 1913 at Muskogee. I had been told by Mr. Lieber that he had this blower, but at that time I had not seen it.

I first learned of the Hastings incubator being operated in Muskogee, I think in the spring of 1923. I learned of it in conversations with Dr. Smith. That would be my best recollection. I cannot say how I first learned of it; when I became associated with Dr. Smith in the spring of 1923 and we were in incubator work. Dr. Smith knew in 1923 there had been an incubator started down there.

[fol. 944] Redirect examination.

By Mr. Ely:

My reason for not carrying my negotiations any further with Mr. Lieber was not due to the fact that he had requested that the blower be not destroyed; that was not the reason I stopped my negotiations with Mr. Lieber. One thing that I had in mind at that time was that we would get up a museum of incubators, and that was part of our

reasons for wanting it. In fact, it was one of the main reasons, but when he put a price on it, such as he did, why then, we immediately lost all interest in it.

The above was all the testimony offered at the main hearing or trial of the within case. April 15, 1935, the following testimony was submitted to the Court at Buffalo, N. Y.

ROBB O. BARTHOLOMEW

ROBB O. BARTHOLOMEW, called as a witness on behalf of the plaintiff, and sworn, testified as follows:

Direct examination.

By Mr. Ely:

My residence is 2930 Edge Hill Road, Cleveland Heights, Ohio. I am a practicing attorney in Cleveland. I have been a practicing attorney for approximately twenty-five years. I know Dr. Samuel B. Smith of Cleveland, the plaintiff in this case, and have represented him in matters. I represented Doctor Smith for a couple of years in personal matters and matters connected with some of his companies, [fol. 945] and also in reference to his dealings with the Buckeye Incubator Company, Springfield, Ohio. I recall the transaction by which the transfer of the title to the patent was made from the Buckeye Incubator Company to Doctor Smith.

I am familiar with the Smith patent in suit on the process of incubation. I recall negotiations and consummations of transfer in title as to this patent. There were negotiations beginning early January, 1926, culminating April 29, 1927, in the execution of assignments of the three patents, then owned by the Buckeye Incubator Company back to Doctor Smith. Those were assignments of patents Doctor Smith had originally procured on his inventions—incubators. Prior to April, 1927, title to the patents had been for a number of years in the Buckeye Incubator Company. I think the title ran back to about 1919—by assignment of application of patents to 1917. I think the patents came out in 1918 and they were then in the name of the Buckeye Incubator Company.

I am handed certain documents to which I refer. (Handing papers to witness.)

There is an agreement contract between Samuel B. Smith and the Buckeye Incubator Company—the first document that I hold. This is dated April 29, 1927. That is the contract which was drawn between the parties—executed by the parties embracing their agreement regarding the sales of patents—transfer of the title of patents back to Doctor Smith and his license to Buckeye Incubator Company under it. I was present when those papers were executed. I witnessed the execution of them. There were present at [fol. 946] the time they were executed—Arthur Hill, President of the Buckeye Incubator Company, Mr. Essex, Secretary of the Buckeye Incubator Company, attorney Cole from Springfield, Ohio, the Buckeye Company's attorney—regular attorney, and Mr. Staley from Springfield, Ohio, patent attorney, representing the Buckeye Incubator Company in patent matters, Doctor Smith, and myself. I recognize the several signatures there as the signatures which I saw made at the time these papers were executed.

Mr. Ely: I offer those documents in evidence, your Honor. I offer them in the following order: As Exhibit No. 32, the assignments from the Buckeye Incubator Company to Doctor Samuel B. Smith; as Exhibit 33, the license agreement from Smith back to the Buckeye Company; and as Exhibit 34, the contract between the Buckeye Company and Doctor Smith, all dated April 29, 1927.

(Mr. Toulmin examines documents.)

Mr. Toulmin: We object to Exhibits 33 and 34 in addition to our general objection that I first stated, on the ground that they are carbon copies, and are not the original documents. I have heard no proof here as to their being the originals.

Mr. Ely: They are original signed copies.

The Court: Do you mean duplicates?

Mr. Ely: Yes, but they are signed copies.

(The Court examines the documents.)

[fol. 947] By the Court:

Q. Mr. Bartholomew, this license or paper purported to be a license—is that the original signature of Mr. Smith?

A. It is, your Honor.

Q. Is that the signature made at the time of the execution of this paper?

A. It was.

Q. The paper was exhibited by you to the Buckeye Company in your presence?

A. This was delivered to the Smith Incubator Company.

The Court: I see.

Mr. Toulmin; I withdraw my objection, your Honor; that is proper proof.

Q. This signature to the other instrument, which is called "contract", dated January 29, 1927, purporting to be signed by Mr. Smith, A. W. Hill, R. A. Essex—are those the signatures of those individuals?

A. Yes, your Honor, there were copies delivered to Doctor Smith, and the other copy sent to the attorneys for the Buckeye Incubator Company.

The Court: Objection overruled.

(Assignment from the Buckeye Incubator Company to Doctor Samuel B. Smith received in evidence as Plaintiff's Exhibit No. 32.)

(License agreement from Doctor Smith back to the Buckeye Company, dated April 29, 1927, received in evidence as Plaintiff's Exhibit No. 33.)

(Contract between the Buckeye Company and Doctor Smith, dated April 29, 1927, received in evidence as Plaintiff's Exhibit No. 34.)

[fol. 948] The Court: Is there an admission that these patents were issued to the Buckeye people?

Mr. Ely: Yes.

The Court: All right.

This concluded the testimony of the witness Bartholomew.

JOSEPH I. TAGGART, recalled on behalf of the plaintiff, testified as follows:

Redirect examination.

By Mr. Ely:

I am shown photostatic copies of Exhibits 32, 33 and 34, which have just been offered in evidence on behalf of the plaintiff. I am familiar with those documents. Those documents are still in force.

Q. In the matter of bringing suits under the patent, Mr. Taggart, has Buckeye Incubator Company requested Doctor Smith, do you know, to bring suits under the patent?

Mr. Toulmin: We object. The Buckeye Incubator Company again is not here. The Buckeye's rights cannot be determined without them being here.

The Court: Is that offered to preclude the right of the Buckeye Incubator Company to make any claim?

Mr. Ely: Yes.

The Court: I will exclude it then, in view of my prior ruling.

Mr. Ely: Exception, your Honor. That's all.

[fol. 949] Mr. Toulmin: I hope your Honor will not think I am captious, but I want to make a perfect record on this. If the Court please, I now move for a judgment on behalf of the defendants in this case so far as the title is concerned—the other part is still awaiting your Honor's decision—on the ground: first, that there has not been made here proper proof of the title in S. B. Smith, the patentee; second, no proof has been made in this case with the proper and necessary parties before the Court, the Buckeye Incubator Company being absent from the presence of the Court, and it being a necessary and proper party for the disposition of the entire rights and interests under the patent so far as these defendants are concerned, and so far as the ownership of the patent is concerned. We therefore move the Court for such judgment on behalf of the defendants for those two reasons. I might say to the Court that I have submitted a memorandum on the subject of the insufficiency of the parties which is still before your Honor.

You have overruled me on the other proposition to which I took an exception.

The Court: Yes. In view of the matter as it stands today, this Court is controlled by the decision of the Supreme Court as to the infringement by the defendant—the infringement itself—and it is my view that the fact that a portion of the eggs in the process of incubation or hatching are removed from the hatchery and the process concluded [fol. 950] in a separate place does not differentiate this case from the decision of the Supreme Court involving this patent. It is my view that the title to the patent has been established by the record now, and the only question I would like to look at a little further is the question whether the Buckeye people should have been made a party to this suit by reason of the nature of the license granted them. That is my view-point. That is my view. The remaining point is—I will look that over.

The foregoing contains all the testimony offered in these cases, the same being reduced to a narrative form pursuant to Equity Rule 75 (b) except where set forth verbatim in question and answer form in order that the same may be more clearly understood.

The defendants present the above and foregoing as their narrative statement of all the evidence in the case submitted or offered before the District Court and pray that the same be approved by the Court, signed and sealed as such and made a part of this record.

Toulmin & Toulmin, Attorneys for Defendants.

ORDER APPROVING NARRATIVE STATEMENT OF THE EVIDENCE

The foregoing narrative statement of the testimony in these cases is hereby approved by me and ordered to be made a part of the Record in these cases, this the 2nd day of December, 1935.

John Knight, U. S. District Judge.

671

S. B. SMITH.

INCUBATOR.

APPLICATION FILED OCT. 26, 1916.

1,262,860.

Patented Apr. 16,

2 SHEETS—SHEET

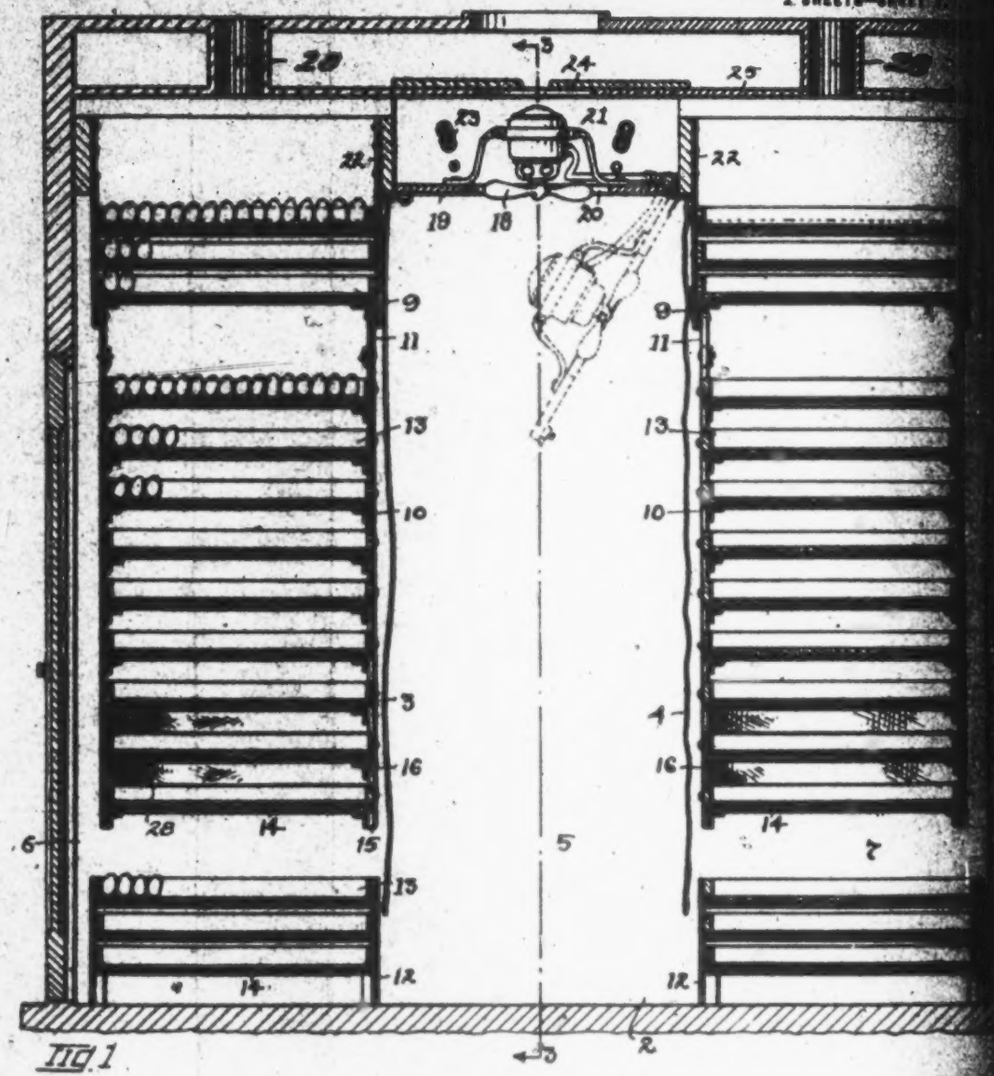


Fig. 1

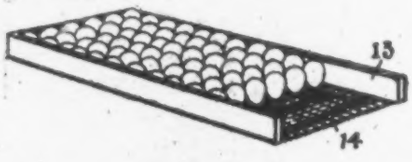


Fig. 2

INVENTOR.
S.B.SMITH.
BY Staley & Bowman
ATTORNEYS

672

S. B. SMITH.

INCUBATOR.

APPLICATION FILED OCT. 28, 1916.

1,262,860.

Patented Apr. 16, 1

2 SHEETS—SHEET 2.

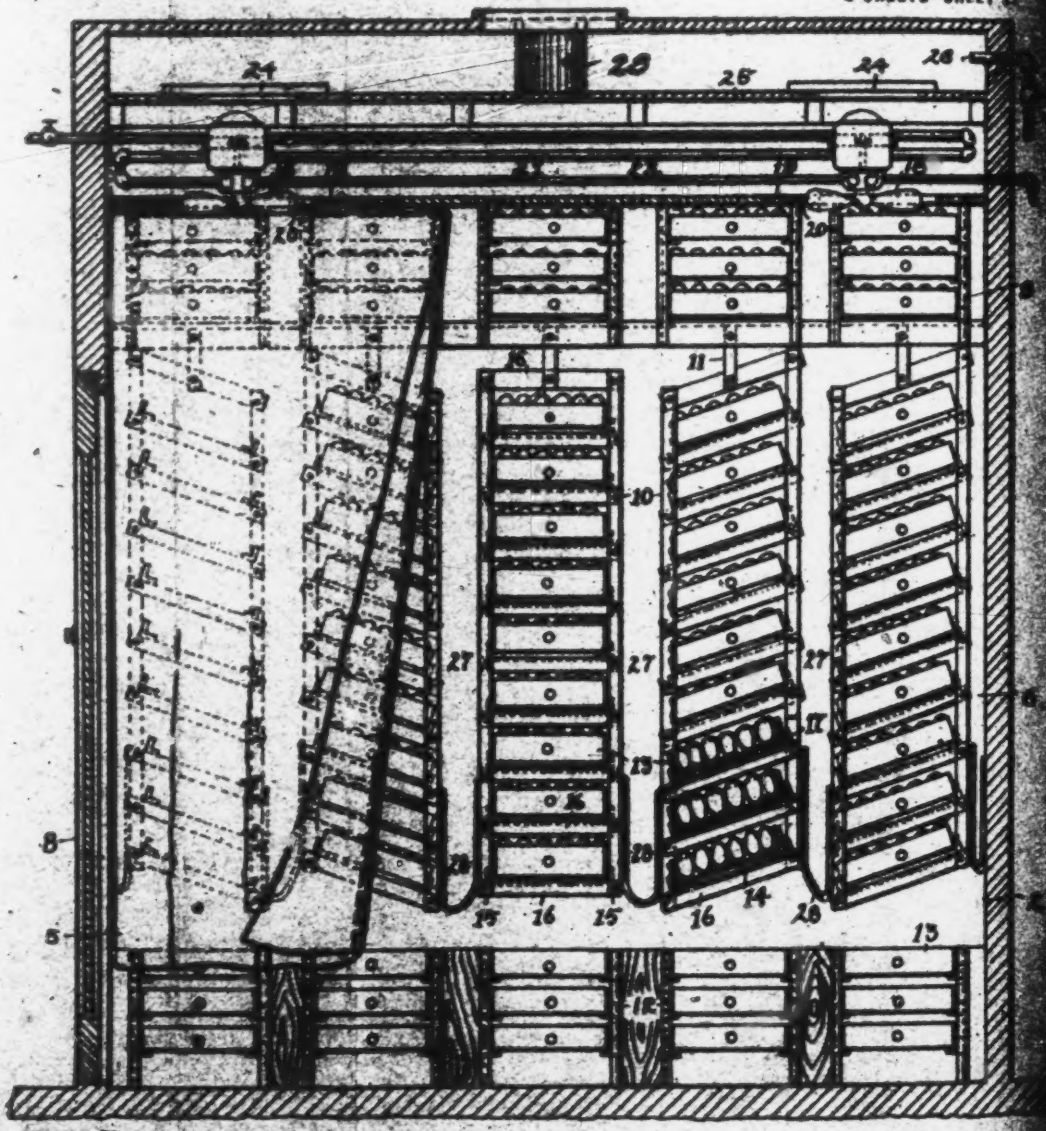


FIG 3

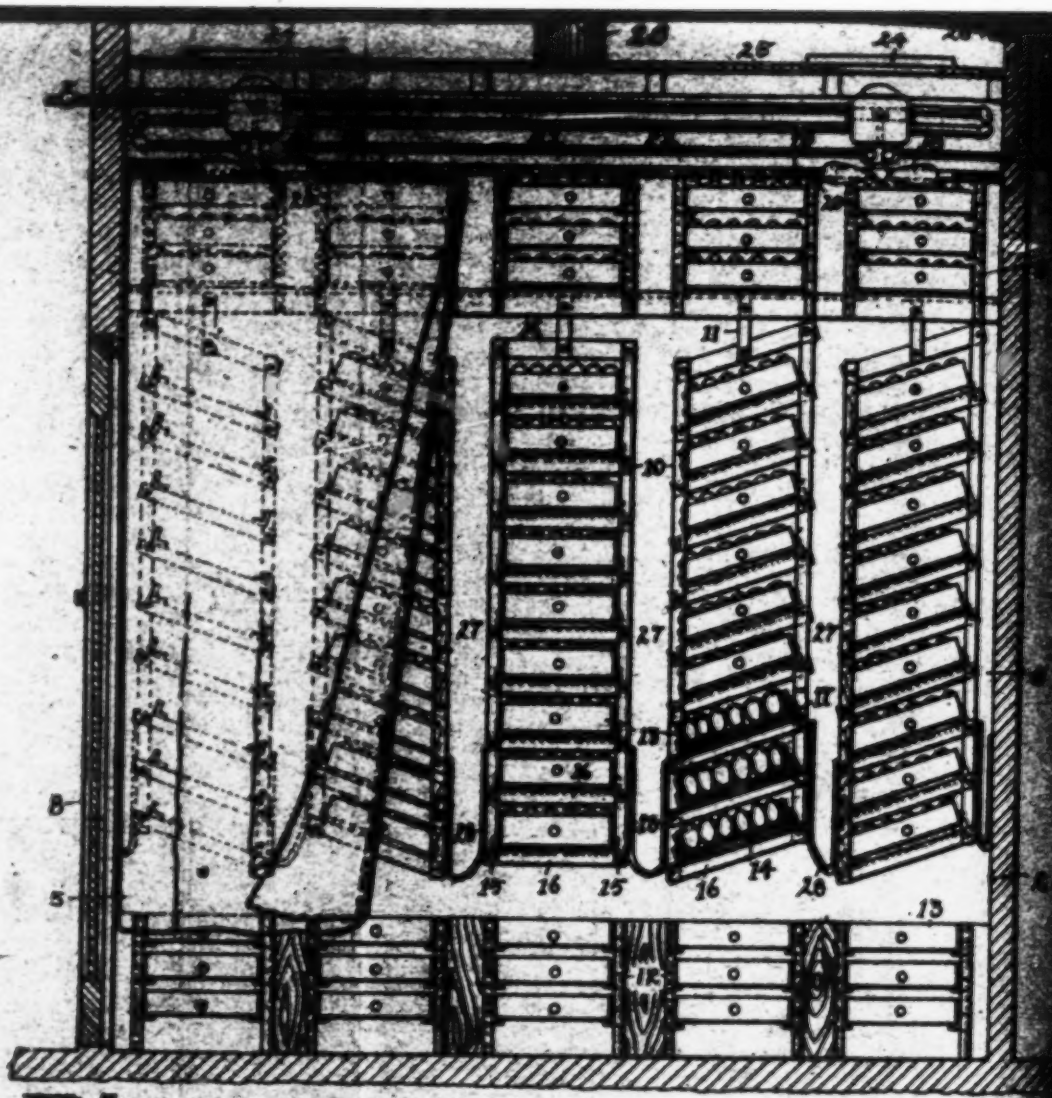


FIG 3

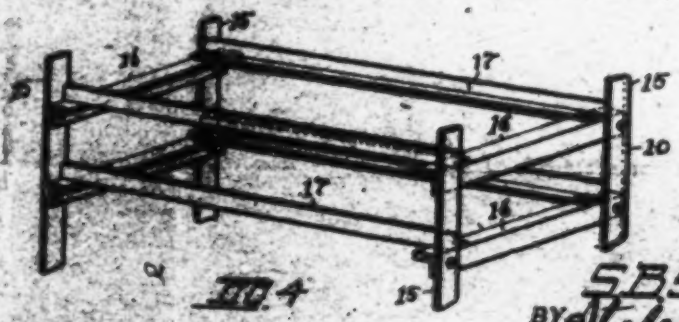


FIG 4

INVENTOR.
S. B. SMITH.
BY Staley & Bowman.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL B. SMITH, OF CLEVELAND, OHIO, ASSIGNOR TO THE BUCKEYE INCUBATOR CO., OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

INCUBATOR.

1,262,860. Specification of Letters Patent. Patented Apr. 16, 1918.

Application filed October 26, 1916. Serial No. 127,915.

To all whom it may concern:

Be it known that I, SAMUEL B. SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Incubators, of which the following is a specification.

The improved apparatus and method, is particularly designed for extensive operations wherein a chamber of large dimensions is adapted to contain thousands of eggs in separate trays arranged in tiers and the method of heating is such that the heated air is adapted to the eggs in various stages of incubation. There is a forced circulation of hot air through the chamber which is adapted preferably to maintain all eggs at temperatures between 100° and 105° Fahrenheit approximately and this improved system contemplates that fresh eggs will be placed in a horizontal plane, preferably by means of trays supported in horizontal planes, and after the eggs have been subject to the circulation of hot air for a predetermined time (the air circulating largely around the eggs) they will be placed in a tilted or inclined position in a different location but still subject to the same column of air and at this period of incubation they will be tilted in different planes at regular intervals during the time they remain in this latter position, and after they have remained for a predetermined time they will be again moved to a different position with reference to the forced circulation of hot air and so placed therein that the air will tend to keep the eggs below 106° temperature, and in this last named position the air will be forced to pass [illegible] and will in effect

In the accompanying drawings:

Figure 1 is a cross section of my improved incubator.

Fig. 2 is a perspective view of one of the egg trays with one end removed to more clearly disclose the open mesh bottom.

Fig. 3 is a vertical section of the incubator on line 3—3, Fig. 1.

Fig. 4 is a perspective view of a portion of one of the tilting racks for the trays.

The invention comprises a walled chamber 2 corresponding in size to that of an ordinary room, say approximately nine feet high, eight to ten feet wide, and of any desired length, and this chamber is subdivided longitudinally by two parallel rows of curtains 3 and 4 to provide a central compartment or corridor 5 and side compartments 6 and 7. Entrance to the corridor is gained by a door 8, and the compartments behind the curtains contain elevated stationary racks 9 which are within convenient reach of the attendant for introducing the fresh supply and from which elevated position the trays may be shifted at the proper time to a tier of tilting racks 10 on a lower plane and suspended therefrom by links 11. A series of stationary racks 12 are also arranged beneath the tilting racks 10, and all of said racks are of open construction and of the same size to permit interchange of the shallow trays 13 for the eggs to be hatched. These trays are provided with open mesh bottoms 14 upon which the smaller ends of the eggs rest in close and solid formation, and each tray of eggs occupies the upper [illegible] rack 9 for the first three days, and is then transferred to a place in the upper end of the tilting rack 10. During the next fifteen

Application filed October 26, 1916. Serial No. 127,815.

To all whom it may concern:

Be it known that I, SAMUEL B. SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Incubators, of which the following is a specification.

The improved apparatus and method, is particularly designed for extensive operations wherein a chamber of large dimensions is adapted to contain thousands of eggs in separate trays arranged in tiers and the method of heating is such that the heated air is adapted to the eggs in various stages of incubation. There is a forced circulation of hot air through the chamber which is adapted preferably to maintain all eggs at temperatures between 100° and 105° Fahrenheit approximately and this improved system contemplates that fresh eggs will be placed in a horizontal plane, preferably by means of trays supported in horizontal planes, and after the eggs have been subject to the circulation of hot air for a predetermined time (the air circulating largely around the eggs) they will be placed in a tilted or inclined position in a different location but still subject to the same column of air and at this period of incubation they will be tilted in different planes at regular intervals during the time they remain in this latter position, and after they have remained for a predetermined time they will be again moved to a different position with reference to the forced circulation of hot air and so placed therein that the air will tend to keep the eggs below 105° temperature, and in this last named position the air will be forced to pass between the different eggs and will in effect act as a cooling medium for the eggs. The temperature of circulating air should be such as will prevent the eggs in the early stage of incubation from falling below 100° and the speed or velocity of the circulating air should be such as to carry the heat away from the eggs in the later stage of incubation and thereby hold the temperature of those eggs at 105° or slightly below that. It is manifest that the temperature will remain practically the same throughout the column of eggs, but the air is impelled with sufficient velocity to carry the heat away from the eggs which happen to be in the advanced stage of incubation.

In the accompanying drawings:

Figure 1 is a cross section of my improved incubator.

Fig. 2 is a perspective view of one of the egg trays with one end removed to more clearly disclose the open mesh bottom.

Fig. 3 is a vertical section of the incubator on line 3—3, Fig. 1.

Fig. 4 is a perspective view of a portion of one of the tilting racks for the trays.

The invention comprises a walled chamber 2 corresponding in size to that of an ordinary room, say approximately nine feet high, eight to ten feet wide, and of any desired length, and this chamber is subdivided longitudinally by two parallel rows of curtains 3 and 4 to provide a central compartment or corridor 5 and side compartments 6 and 7. Entrance to the corridor is gained by a door 8, and the compartments behind the curtains contain elevated stationary racks 9 which are within convenient reach of the attendant for introducing the fresh supply and from which elevated position the trays may be shifted at the proper time to a tier of tilting racks 10 on a lower plane and suspended therefrom by links 11. A series of stationary racks 12 are also arranged beneath the tilting racks 10, and all of said racks are of open construction and of the same size to permit interchange of the shallow trays 13 for the eggs to be hatched. These trays are provided with open mesh bottoms 14 upon which the smaller ends of the eggs rest in close and solid formation, and each tray of eggs occupies the upper rack 9 for the first three days, and is then transferred to a place in the upper end of the tilting rack 10. During the next fifteen days the trays in the tilting rack are shifted from higher to lower planes therein and tilted at frequent intervals to stand in oppositely-inclined positions. The tilting of the eggs is preferably arranged to put the eggs substantially on their sides. When the eggs in the lower-most trays in the tilting racks 10 are about ready to hatch each tray is transferred to the stationary rack 12 where the chicks may be removed as occasion requires.

Each tilting rack 10 comprises perpendicular corner bars 15 pivotally united by a series of cross bars 16 carrying connecting angle irons 17 extending from front to rear

at each side and upon which the trays are adapted to be slidably supported. The links 11 are pivotally connected at the center of the uppermost cross bars 16 of each tilting rack, thus permitting an entire series of trays to be placed in an inclined position by merely raising or lowering one side of the rack by hand engagement. The weight and friction and balance of the parts cause the trays to remain in any shifted position, whether horizontal or inclined. The fans or series of fans 18 mounted upon the hinged trap doors 19 forming the ceiling of the central corridor 5 constitute the means for forcing the hot air through the chamber and there are circular openings 20 provided in said doors within which the fans are arranged properly. The longitudinal space 21 above the fans has open communication above the side walls 22 with the upper ends of the rack compartments behind the curtains 3 and 4 and these curtains extend a sufficient distance, as indicated in Fig. 1, to cause the heated air distributed by the fans to pass downwardly through the central corridor to a point near the bottom of the chamber where it can pass into the space occupied by the trays. As explained later the trays near the bottom are preferably arranged so that the air is forced to pass between the eggs in each tray thereby cooling or holding the temperature of those eggs down. Thence the air passes into spaces above the lower series of trays until it reaches the distributing space 21 above the fan. Coils of heating pipe 23 are arranged in the space 21 to heat the air and more or less fresh air may be taken in through the valved opening 24 above the space 21 and this fresh supply of air may be charged with steam to a greater or less degree by means of a valve controlled [illegible] or pipe 26 see Fig. 2. The [illegible] for the release of foul air are made of such restricted capacity as to prevent the undue escape of moisture. It is possible to limit the openings and so control the [illegible] by means of the vitalizing effect of the [illegible] current upon the body of the air within the chamber. By lowering the hinged trap doors [illegible]

lower trays and as the danger is [illegible] temperature will rise in these [illegible] point injurious to incubation the [illegible] method disclosed herein permits the [illegible] lating air to act as a medium to prev[illegible] over heating at this stage of incubati[illegible] this is accomplished by promoting [illegible] duced draft within the lower tr[illegible]ys. obvious that the fans can be so arran[illegible] can be operated at such speed as t[illegible] the hot air to circulate fast enough t[illegible] the temperature throughout the cha[illegible] tween the limits of 100° and 105°.

It, therefore, appears that the i[illegible] apparatus and method contemplates [illegible] plication of hot air circulating in a [illegible] with such speed as to keep the temp[illegible] substantially uniform and so arrang[illegible] eggs that the fresh eggs are placed [illegible] point in the column of air and held [illegible] horizontal plane until they reach a [illegible] termined stage of incubation and th[illegible] at a different point in the same col[illegible] air and kept in planes inclined to the [illegible] zontal and thereafter placed at such a [illegible] in the column of air that the forced d[illegible] air acts to hold the eggs at a uniform [illegible] perature and to prevent them from b[illegible] ing overheated and thereafter placi[illegible] eggs into final position for the ha[illegible] operation.

Any suitable thermostatic means m[illegible] employed for regulating the temper[illegible] such for instance as a thermostat co[illegible] employed in incubators of a well k[illegible] construction and illustrated in Lette[illegible] ent No. 1,111,138, dated September [illegible] 1914, which thermostat may be suitabl[illegible] nected to the valve controlling the s[illegible] hot water, as the case may be, which [illegible] through the pipes 23.

Having thus described my inven[illegible] claim:—

1. The method of hatching a plur[illegible] eggs by arranging them at different l[illegible] a closed chamber having restricted e[illegible] of sufficient capacity for the escape [illegible] air without undue loss of moisture [illegible] plying a current of heated air, said [illegible] being created by means other than [illegible] [illegible] of temperature and of sufficient [illegible] to circulate, diffuse and main[illegible] air throughout the chamber at [illegible]

whether horizontal or inclined. The fans or series of fans 18 mounted upon the hinged trap doors 19 forming the ceiling of the central corridor 5 constitute the means for forcing the hot air through the chamber and there are circular openings 20 provided in said doors within which the fans are arranged properly. The longitudinal space 21 above the fans has open communication above the side walls 22 with the upper ends of the rack compartments behind the curtains 3 and 4 and these curtains extend a sufficient distance, as indicated in Fig. 1, to cause the heated air distributed by the fans to pass downwardly through the central corridor to a point near the bottom of the chamber where it can pass into the space occupied by the trays. As explained later the trays near the bottom are preferably arranged so that the air is forced to pass between the eggs in each tray thereby cooling or holding the temperature of these eggs down. Thence the air passes into spaces above the lower series of trays until it reaches the distributing space 21 above the fan. Coils of heating pipe 23 are arranged in the space 21 to heat the air and more or less fresh air may be taken in through the valved opening 24 above the space 21 and this fresh supply of air may be charged with steam to a greater or less degree by means of a valve controlled jet or pipe 26 see Fig. 3. The outlets 28 for the release of foul air are made of such restricted capacity as to prevent the undue escape of moisture. It is possible to limit the openings and so conserve the moisture by reason of the vitalizing effect of the power driven current upon the body of the air within the chamber. By lowering the hinged trap doors, the [illegible] are also easily reached for inspection, etc.

In Fig. 3 only a single curtain 3 is shown in place, the curtain or curtains at the right being entirely removed to disclose the racks and trays in full lines, and it will be also noted that the [illegible] between the adjacent tilting racks 10 are closed at their lower ends by flexible strips of fabric which are attached to and extend upward at each side of said racks so as to compel the air to circulate through the rack bottom and around and above each egg as heretofore referred to, and as the eggs further advanced in incubation are contained in these

the hot air to circulate fast enough to the temperature throughout the cha tween the limits of 100° and 105°.

It, therefore, appears that the i apparatus and method contemplates plication of hot air circulating in a with such speed as to keep the temp substantially uniform and so arrang eggs that the fresh eggs are placed point in the column of air and hel horizontal plane until they reach a termined stage of incubation and th at a different point in the same col air and kept in planes inclined to the zontal and thereafter placed at such a in the column of air that the forced d air acts to hold the eggs at a uniform perature and to prevent them from b ing overheated and thereafter placing eggs into final position for the hat operation.

Any suitable thermostatic means m employed for regulating the temper such for instance as a thermostat co employed in incubators of a well-k construction and illustrated in Letters ent No. 1,111,188, dated September 1914, which thermostat may be suitably nected to the valve controlling the steam hot water, as the case may be, which p through the pipes 23.

Having thus described my invention, claim:—

1. The method of hatching a plurality of eggs by arranging them at different levels a closed chamber having restricted openi of sufficient capacity for the escape of f air without undue loss of moisture and a plying a current of heated air, said curre being created by means other than vari tions of temperature and of sufficient vel ity to circulate, diffuse and maintain the air throughout the chamber at substantially the same temperature, whereby the air will be vitalized, the moisture conserved and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in a less advanced stage for the purpose specified.

2. The method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings of sufficient capacity for the escape of foul air without undue loss of moisture and applying a power driven current of heated

lower trays and as the danger is that the temperature will rise in these eggs to a point injurious to incubation the improved method disclosed herein permits the circulating air to act as a medium to prevent the over heating at this stage of incubation and this is accomplished by promoting an induced draft within the lower trays. It is obvious that the fans can be so arranged and can be operated at such speed as to cause the hot air to circulate fast enough to keep the temperature throughout the chamber between the limits of 100° and 105°.

It, therefore, appears that the improved apparatus and method contemplates the application of hot air circulating in a column with such speed as to keep the temperature substantially uniform and so arranging the eggs that the fresh eggs are placed at one point in the column of air and held in a horizontal plane until they reach a predetermined stage of incubation and then put at a different point in the same column of air and kept in planes inclined to the horizontal and thereafter placed at such a point in the column of air that the forced draft of air acts to hold the eggs at a uniform temperature and to prevent them from becoming overheated and thereafter placing the eggs into final position for the hatching operation.

Any suitable thermostatic means may be employed for regulating the temperature, such for instance as a thermostat commonly employed in incubators of a well-known construction and illustrated in Letters-Patent No. 1,111,188, dated September 22nd, 1914, which thermostat may be suitably connected to the valve controlling the steam or hot water, as the case may be, which passes through the pipes 23.

Having thus described my invention, I claim:—

1. The method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings of sufficient capacity for the escape of foul air without undue loss of moisture and applying a current of heated air, said current being created by means other than ver-

air in an adjacent chamber through openings into the egg chamber, said current being at sufficient velocity to circulate, diffuse and maintain the air throughout the egg chamber at substantially the same temperature, whereby the air will be vitalized, the moisture conserved and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in a less advanced stage for the purpose specified.

3. The method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings of sufficient capacity for the escape of foul air without undue loss of moisture and applying a vertically directed current of heated air in an adjacent chamber to circulate in said egg chamber through upper and lower openings between said chambers, said current being created by mechanically moving means of such velocity as to diffuse and maintain the air throughout the egg chamber at substantially the same temperature whereby the air will be vitalized, the moisture conserved and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in the less advanced stage for the purpose specified.

4. In an incubator, a closed chamber having a central corridor provided with an air-distributing space in its upper portion and a power-driven fan in said space, curtains at each side of said corridor, arranged to permit the air to circulate from the bottom of the chamber into the part of the chamber behind the curtains, passageways connecting the air distributing space with the corridor and the parts of said chamber behind the curtains, separate stationary and tilting racks behind said curtains, egg-trays having open-mesh bottoms removably mounted upon said racks, and means to heat the air circulated through said chamber.

5. In an incubator, a closed chamber with a vertically disposed partition to provide a corridor having upper and lower passage ways to said chamber, egg trays arranged at different levels in said chamber, a power driven fan creating a current in said corridor to circulate through said passage ways and egg trays, said chamber having restricted openings of sufficient capacity for the discharge of foul air without undue loss of moisture and means to heat the air circulated through said chamber.

In testimony whereof, I have hereunto set my hand this 20th day of October, 1916.

SAMUEL B. SMITH.

Witnesses:

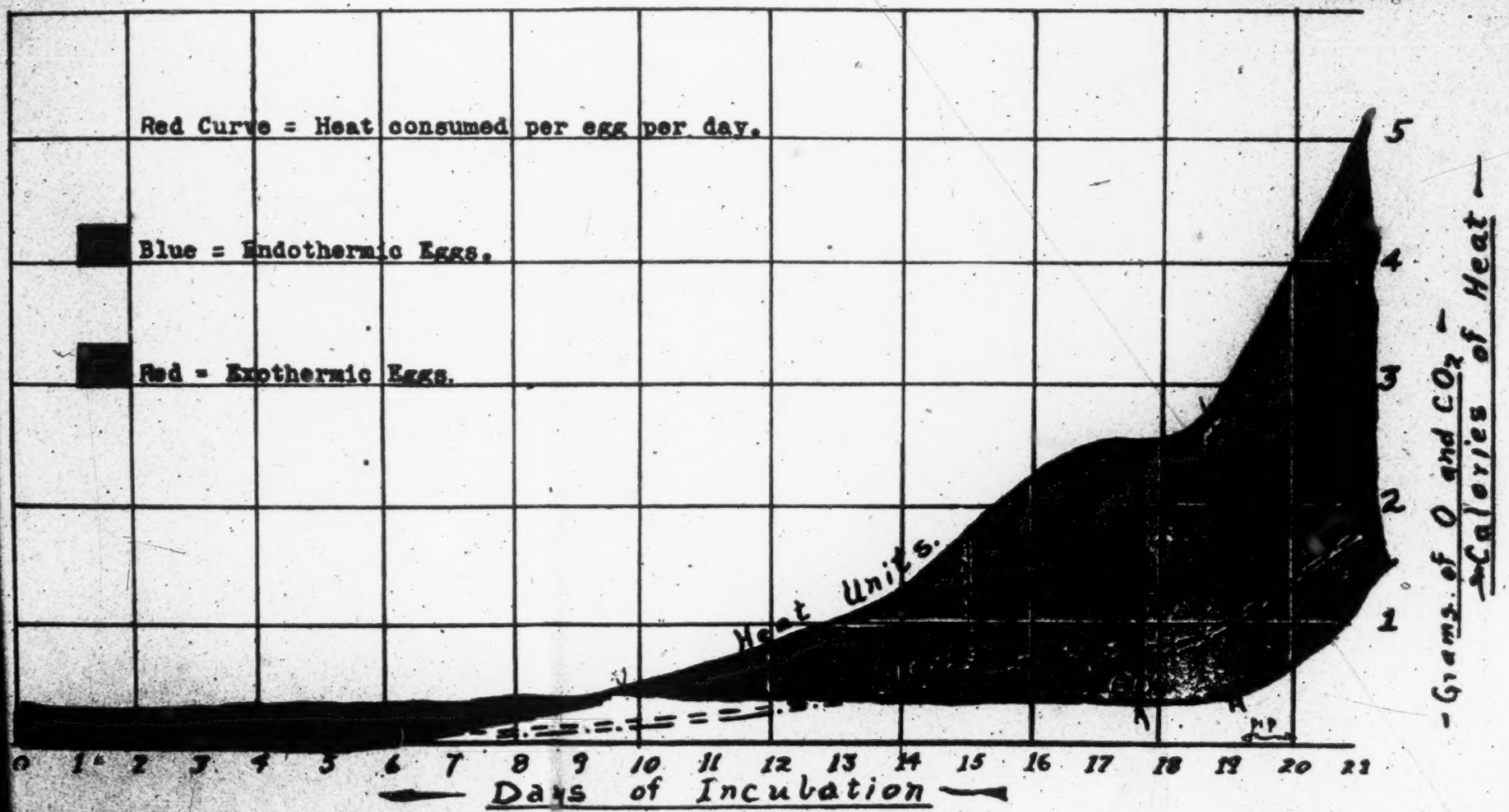
HANNAH D. PLAIN,

IDA M. SMITH.

956

PLAINTIFF'S EXHIBIT No. 3.

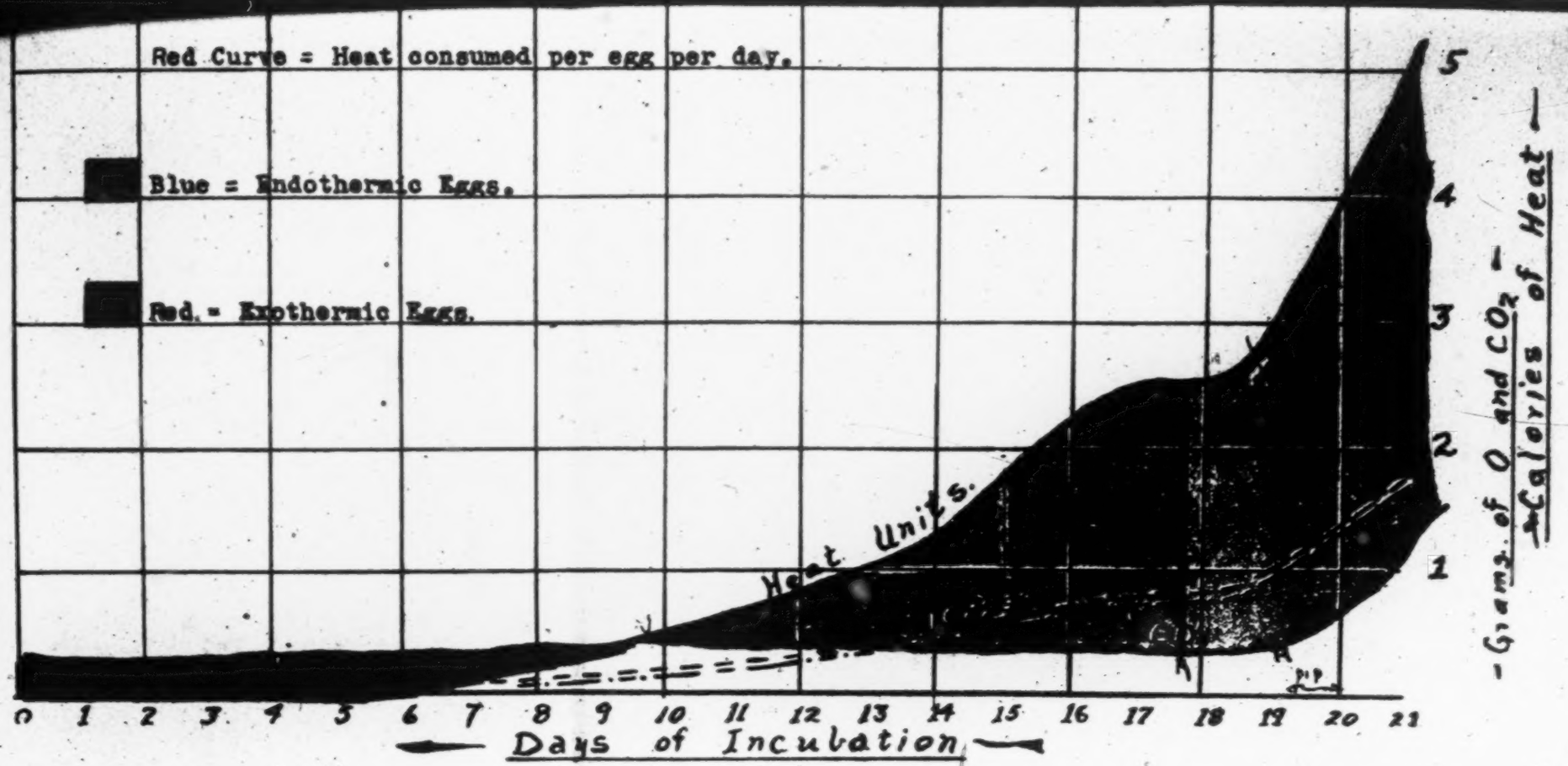
TAGGART HEAT GRAPH



GRAPH SHOWING DEVELOPMENT OF HEAT UNITS DURING INCUBATION.

EXT. 18 21 28

The above graph shows the heat development within an in- during the 21 days of incubation. The heavy of egg per day. then and the time of hatching. There has been several explanations why the embryo apparently stands still during the 18th day. Probably the best explanation is



GRAPH SHOWING DEVELOPMENT OF HEAT UNITS DURING INCUBATION. J.I.T. '18 '21 '28

The above graph shows the heat development within an incubating egg during the 21 days of incubation. The heavy curve indicates heat units given off per egg per day. [illegible] one B.T.U. [illegible] indicates the amount of oxygen consumed. The [illegible] curve shows the carbon-dioxide given off. The oxygen and carbon-dioxide are shown in grams per egg per day.

During the first four days no heat is given off by the egg. Tests indicate that some heat is absorbed during this period. From the fourth day heat is given off by the egg, which steadily increases with the exception of the 18th day. On this day the heat given off, and the oxygen consumed, hold steadily about as at the close of the 17th day. On the 19th day the increasing development of heat is resumed in earnest, and doubles between then and the time of hatching. There has been several explanations why the embryo apparently stands still during the 18th day. Probably the best explanation is that during the first 17 days the chick has been living off of the white of the egg while on the 18th day it begins to assimilate the yolk. This changing food diet probably causes readjustment which temporarily checks development.

The above graphs are the result of studies with calorimeters. The egg is placed within a calorimeter that is maintained at a constant temperature. Proper allowance is made for all heat radiated, and the heat generated within the egg can be measured. At the same time accurate check is kept on all air that passes in and out of the calorimeter, measuring the oxygen consumed and the carbon-dioxide given off. J. I. T. 3/22/30.

PLAINTIFF'S EXHIBIT No. 4 A

CHART SHOWING HEAT DEVELOPED BY INCUBATING EGGS

Number of days eggs were in incubator when tests were started	DURATION OF TIME IN HOURS AFTER SEALING BOXES																		
	½	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9
3 DAYS	98.1	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2
6 "	98.0	98.0	98.0	98.0	98.0	98.0	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1
9 "	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.5
10 "	98.3	98.4	98.4	98.4	98.5	98.6	98.7	98.7	98.8	98.9	98.9	98.9	98.9	99.0	99.0	99.1	99.1	99.1
11 "	98.7	98.7	98.7	98.7	98.8	98.8	98.8	98.9	98.9	98.9	98.9	99.0	99.0	99.0	99.0	99.1	99.1	99.2
12 "	98.8	98.9	99.1	99.3	99.4	99.6	99.7	99.8	99.8	99.9	100.0	100.0	100.1	100.2	100.2	100.3	100.4	100.4
13 "	99.0	99.1	99.2	99.3	99.6	99.8	99.9	100.1	100.3	100.5	100.6	100.8	100.9	101.0	101.0	101.3	101.6	101.6
14 "	100.0	100.8	101.3	101.6	102.0	102.2	102.4	102.6	102.8	103.0	103.1	103.2	103.3	103.5	103.8	104.1	104.2	104.3
15 "	100.0	100.6	101.0	101.5	101.9	102.0	102.3	102.5	102.7	102.8	102.9	103.1	103.2	103.3	103.4	103.4	103.5	103.6
16 "	100.1	100.7	101.6	102.2	102.8	103.2	103.4	103.6	103.7	104.0	104.3	104.5	104.7	104.8	105.0	105.2	105.2	105.3
17 "	101.0	102.2	103.0	103.4	103.7	104.2	104.4	104.8	105.1	105.4	105.6	105.7	105.9	106.2	106.5	107.0	107.1	107.3
18 "	100.6	101.3	101.9	102.4	102.9	103.0	103.2	103.3	103.6	103.7	103.8	103.9	104.1	104.2	104.4	104.5	104.6	104.6
19 "	100.5	101.3	102.1	102.5	102.9	103.2	103.4	103.5	103.6	103.6	103.7	103.7	103.8	103.8	103.9	104.0	104.2	104.3
20 "	100.8	102.2	103.2	104.3	104.5	104.5	104.5	104.5	104.9	105.4	106.0	106.1	106.3	106.5	107.6	107.8	107.9	108.1
21 " eggs near hatching	101.5	102.6	103.6	104.5	105.1	105.9	106.5	106.9	107.2	107.6	107.6	107.6	107.6	107.6	107.6	107.6	107.6	107.6
21 " eggs pipped	102.6	104.3	104.7	105.6	107.0	107.5	108.2	108.6	108.6	108.7	108.8	108.9	109.0	109.0	109.0	109.0	109.0	109.0

TEMPERATURE OF INCUBATOR AT TIME OF TEST - 99°

When a fertile egg is placed in proper environment, the life germ within the egg grows and develops into a baby chick. For the egg of the common fowl, this process takes approximately twenty-one days. During this development practically all of the original egg, with the exception of the shell and some of the water content, is utilized as food. The growing organism also takes in oxygen and gives off carbon dioxide. This assimilation of food and oxygen produces heat just as is the natural result in any growing animal. Eggs under incubation, therefore, will produce heat and the temperature of the eggs in different stages of incubation will vary even though the temperature of the incubator air is kept constant. Among other things, this variation is influenced by the period of incubation, the humidity, the velocity of the air movement, and the texture of the shell.

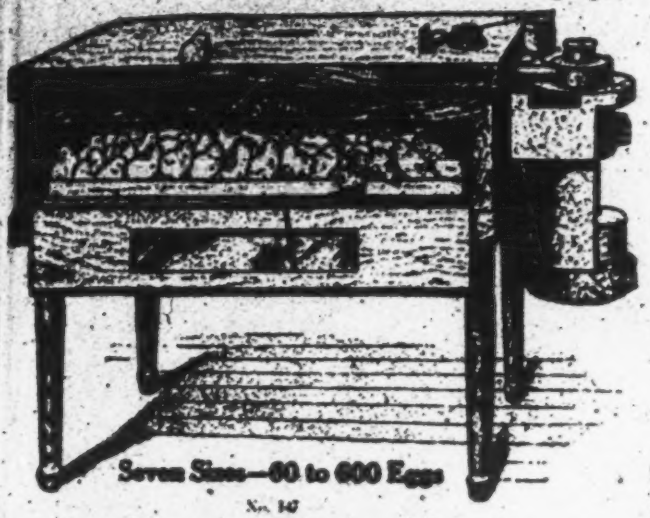
The tests recorded here shows this heat development at different stages of incubation. The incubator was operated in its normal way, filled with eggs, with a temperature of 99° and with the wet bulb reading varying from 85° to 90°, depending upon the day the tests were made. In making these tests, well insulated boxes such as shown in the attached photograph, were placed in the incubator for at least twelve hours before the tests were started, to make sure the boxes assumed the temperature of the air. Twelve fertile eggs of a known stage of incubation were then placed in each box, the lids tightly closed and sealed. A tested clinical thermometer [illegible] through the side of the box, as shown in the photograph, the bulb being completely within the box, but so placed that the temperature of the interior could be read from without. In each case, the thermometer was cooled to 90° or below before it was inserted in the box. The sealed box of eggs was then placed on the floor of the incubator and the readings of the thermometer were recorded at intervals of thirty minutes during the nine hours immediately following. If the eggs within the box developed an appreciable amount of heat, the temperature rose according to the heat development.

The data recorded here shows that for the first ten days of incubation the eggs are cooler than the surrounding air. This is true even if the eggs are developing some animal heat. The reason lies in the cooling effect of the evaporation of water. During incubation eggs lose about one-sixth(1/6) of their weight by evaporation, and this tends to cool them. The data shows that the heat developed by the growing embryo does not completely offset the cooling effect of the evaporating water until about the tenth day. From that time on, the animal heat can be easily recorded.

The data here recorded is a summary of tests conducted at Cleveland, Ohio during the Spring of 1933. A Smith Junior Incubator, full of eggs, was operated in its normal manner. Eggs from widely different flocks and breeds were used.

J.I.T., 9-1-33.

Electrotypes for Newspaper Use

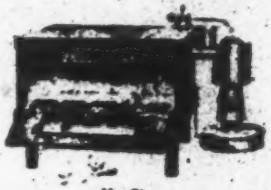


Seven Sizes—60 to 600 Eggs

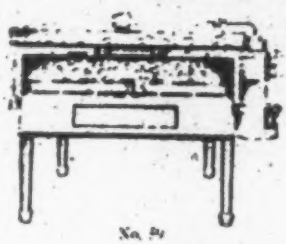
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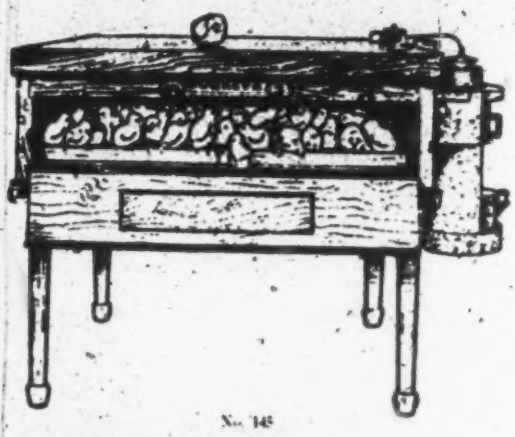
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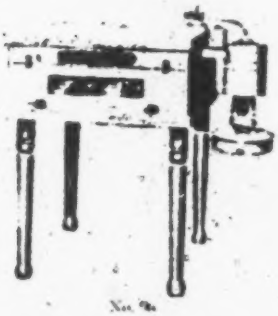
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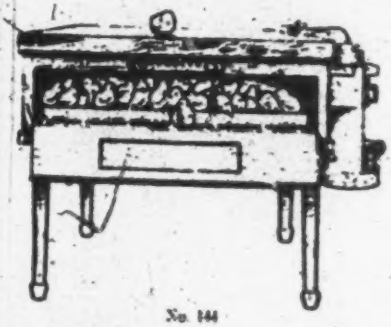
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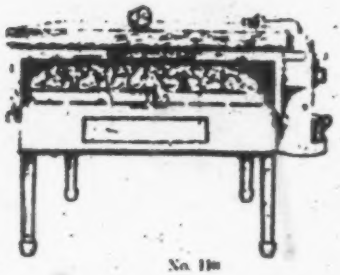
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No. 9a



No. 144

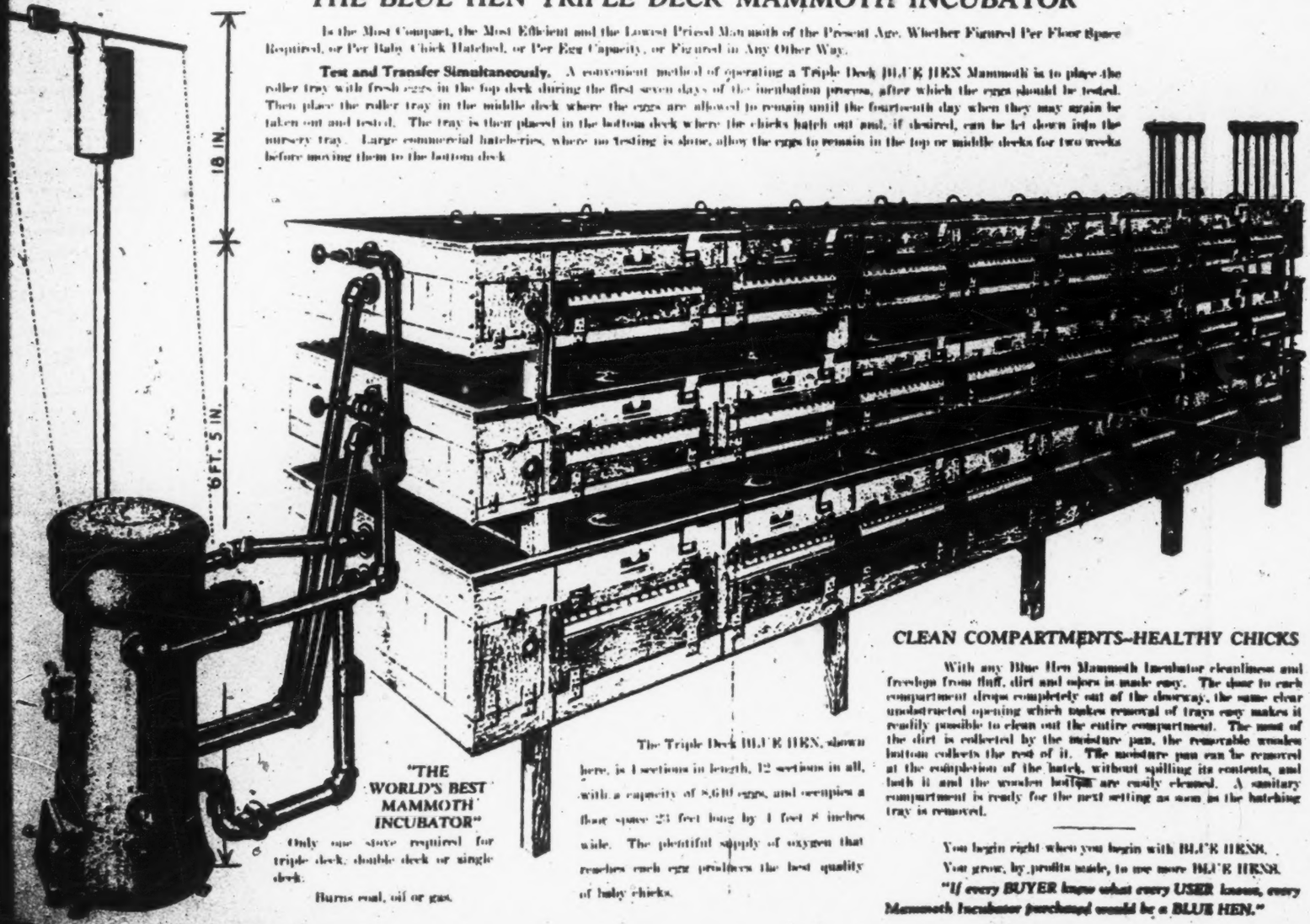


No. 19a

THE BLUE HEN TRIPLE DECK MAMMOTH INCUBATOR

Is the Most Compact, the Most Efficient and the Lowest Priced Mammoth of the Present Age, Whether Figured Per Floor Space Required, or Per Baby Chick Hatched, or Per Egg Capacity, or Figured in Any Other Way.

Test and Transfer Simultaneously. A convenient method of operating a Triple Deck BLUE HEN Mammoth is to place the roller tray with fresh eggs in the top deck during the first seven days of the incubation process, after which the eggs should be tested. Then place the roller tray in the middle deck where the eggs are allowed to remain until the fourteenth day when they may again be taken out and tested. The tray is then placed in the bottom deck where the chicks hatch out and, if desired, can be let down into the nursery tray. Large commercial hatcheries, where no testing is done, allow the eggs to remain in the top or middle decks for two weeks before moving them to the bottom deck



"THE WORLD'S BEST MAMMOTH INCUBATOR"

Only one stove required for triple deck, double deck or single deck.

Burns coal, oil or gas.

The Triple Deck BLUE HEN, shown here, is 4 sections in length, 12 sections in all, with a capacity of 8,640 eggs, and occupies a floor space 23 feet long by 4 feet 8 inches wide. The plentiful supply of oxygen that reaches each egg produces the best quality of baby chicks.

CLEAN COMPARTMENTS--HEALTHY CHICKS

With any Blue Hen Mammoth Incubator cleanliness and freedom from fluff, dirt and odors is made easy. The door to each compartment drops completely out of the doorway, the same clear unobstructed opening which makes removal of trays easy makes it readily possible to clean out the entire compartment. The most of the dirt is collected by the moisture pan, the removable wooden bottom collects the rest of it. The moisture pan can be removed at the completion of the hatch, without spilling its contents, and both it and the wooden bottom are easily cleaned. A sanitary compartment is ready for the next setting as soon as the hatching tray is removed.

You begin right when you begin with BLUE HENS.

You grow, by profits made, to use more BLUE HENS.

"If every BUYER knew what every USER knows, every Mammoth Incubator purchased would be a BLUE HEN."

ASK YOURSELF THESE QUESTIONS

Before Buying Any Incubator, or In Any Incubator Yourself Now Owned, Can I Have a Visit of Mid-winter.

If You Buy A BLUE HEN

If You Buy A BLUE HEN Double Or Triple Deck You Have Only One Stove, Perfectly Regulated

If You Own A BLUE HEN

BLUE HEN Styles Never Change Because The BLUE HEN Principle Of Incubation Has Been Proved Right

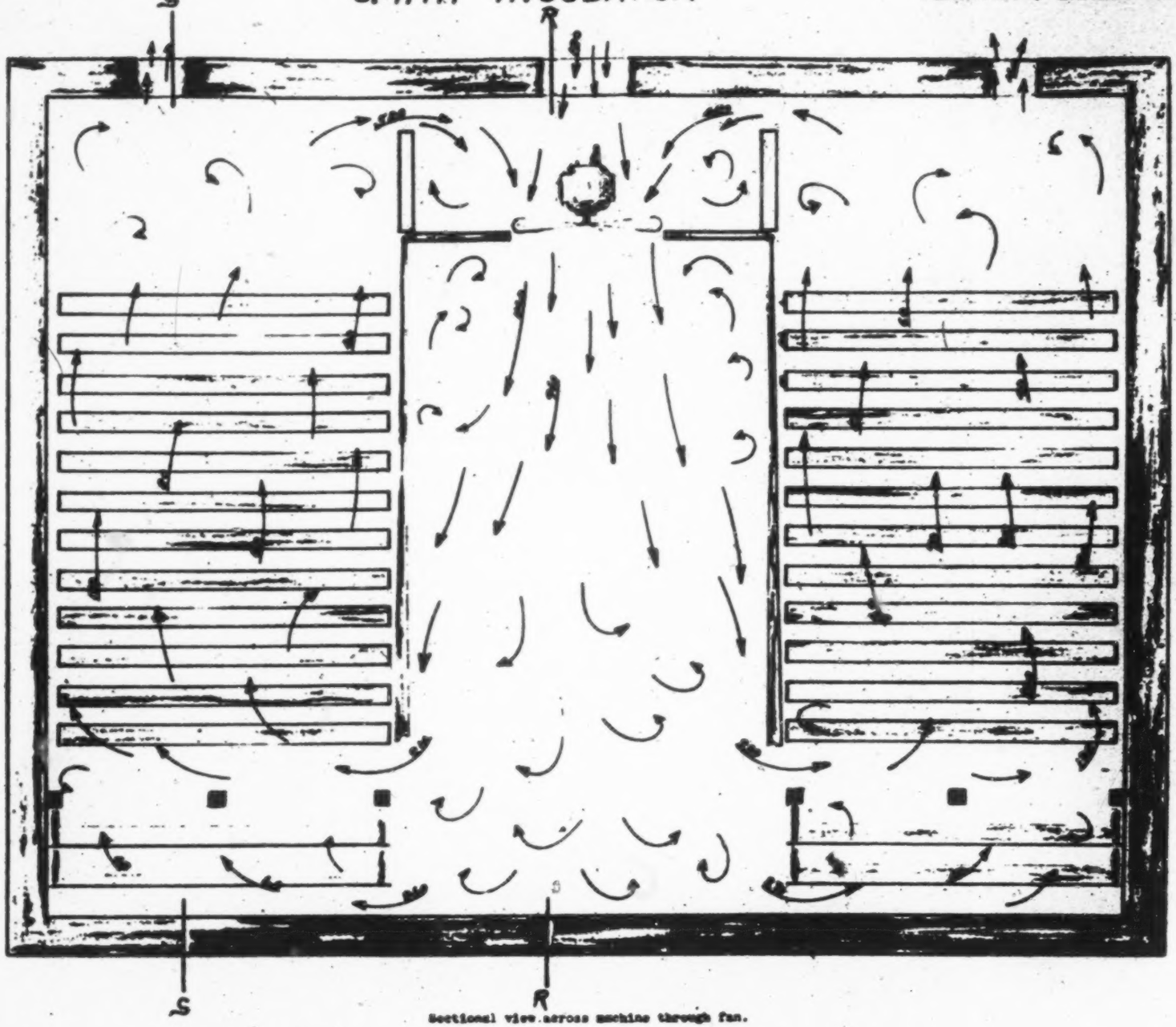
Buy A BLUE HEN

The First BLUE HEN Manufactured Is Still In Use — And Will Last Indefinitely Against Natural Wear And Use

Buy The BLUE HEN For Success

SMITH INCUBATOR

960
PLAINTIFF'S EXHIBIT No. 11 A



Sectional view across machine through fan.

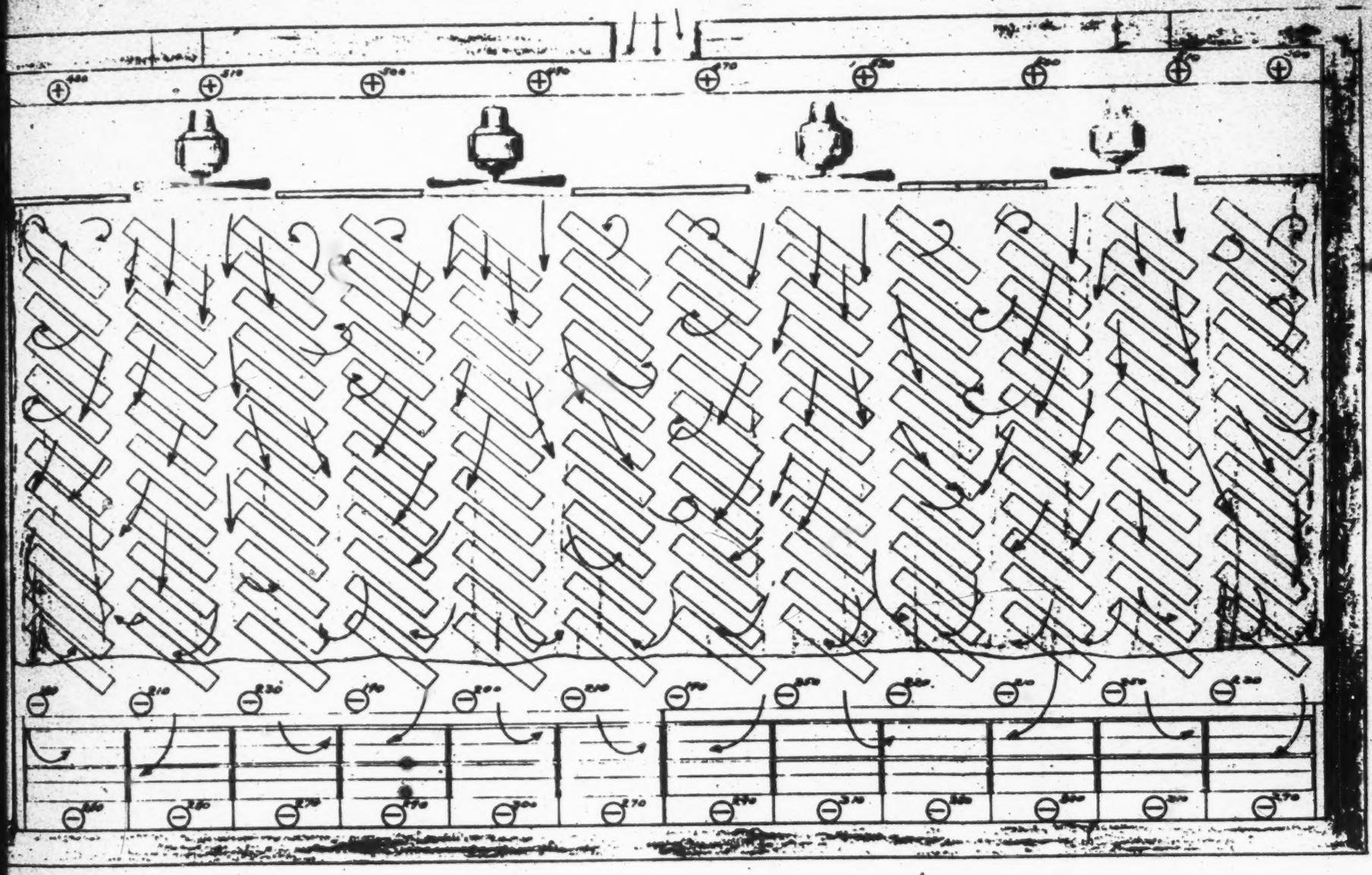
Arrows show general direction of air currents. Numbers give approximate speed of currents as recorded by anemometer (Biram).

Readings in lower two trays were taken with anemometers in the trays.

Air which passes from corridor under lower two trays goes through the trays to space above. In upper twelve trays a very small per cent of the air which has come from the corridor passes through the tray. The large portion of it goes up the air columns between the trays.

SMITH INCUBATOR

PLAINTIFF'S EXHIBIT No. 11 B



Diagrammatic sectional view along corridor.

⊕ 100 — Shows position of anemometer, direction of air flow, and approximate speed of air currents.

⊖ — Air flowing away from fan.

⊕ — Air flowing to the fan.

Shaded portion covering upper twelve trays represents curtain in operating position.

Arrows show general direction of air currents in corridor. Approximate speed of these arrows as recorded by anemometer is given in "Sectional view across machine through fan".

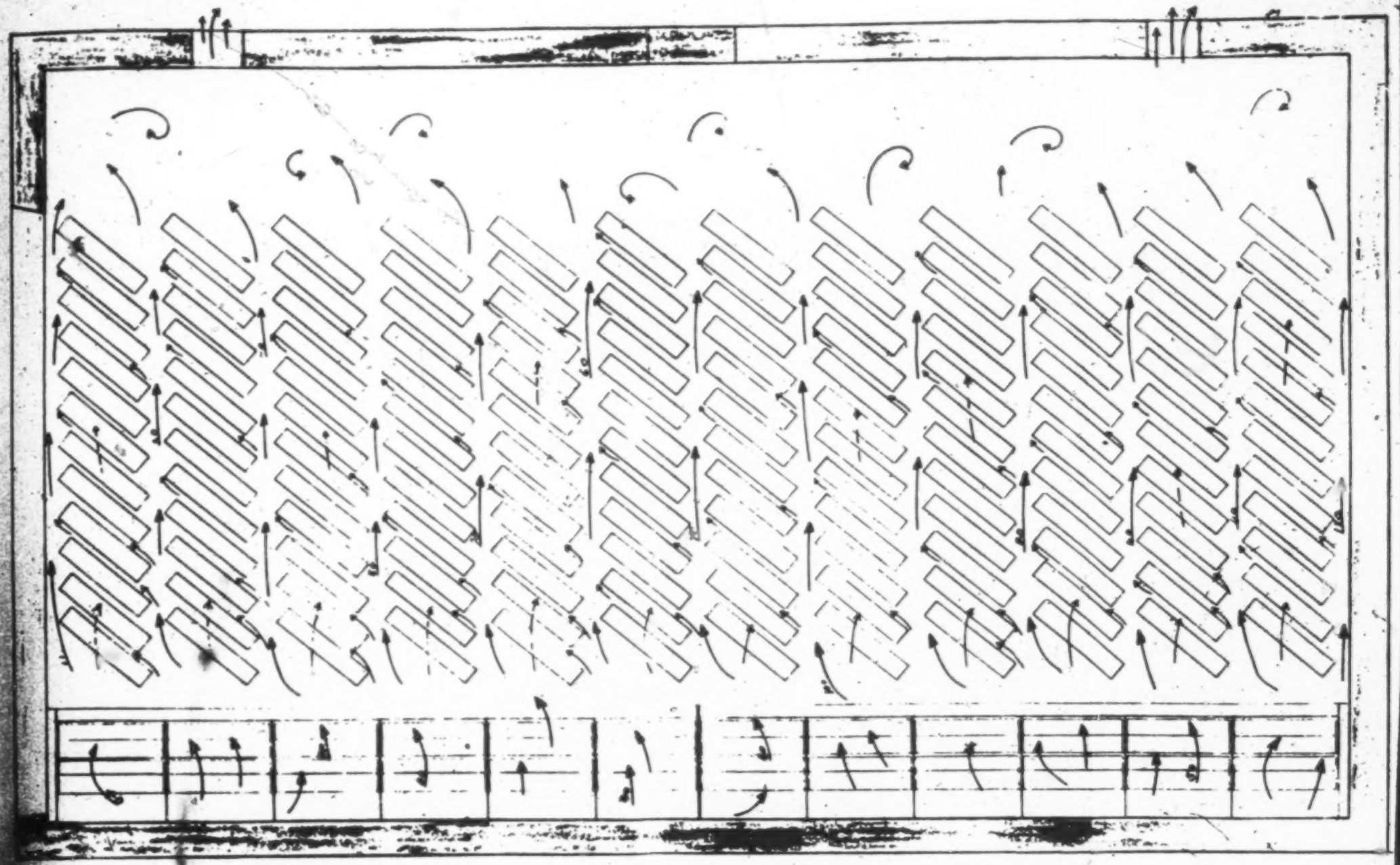
Fans were rotating 1600 to 1650 R. P. M.

RR

962

PLAINTIFF'S EXHIBIT No. 11 C

SMITH INCUBATOR

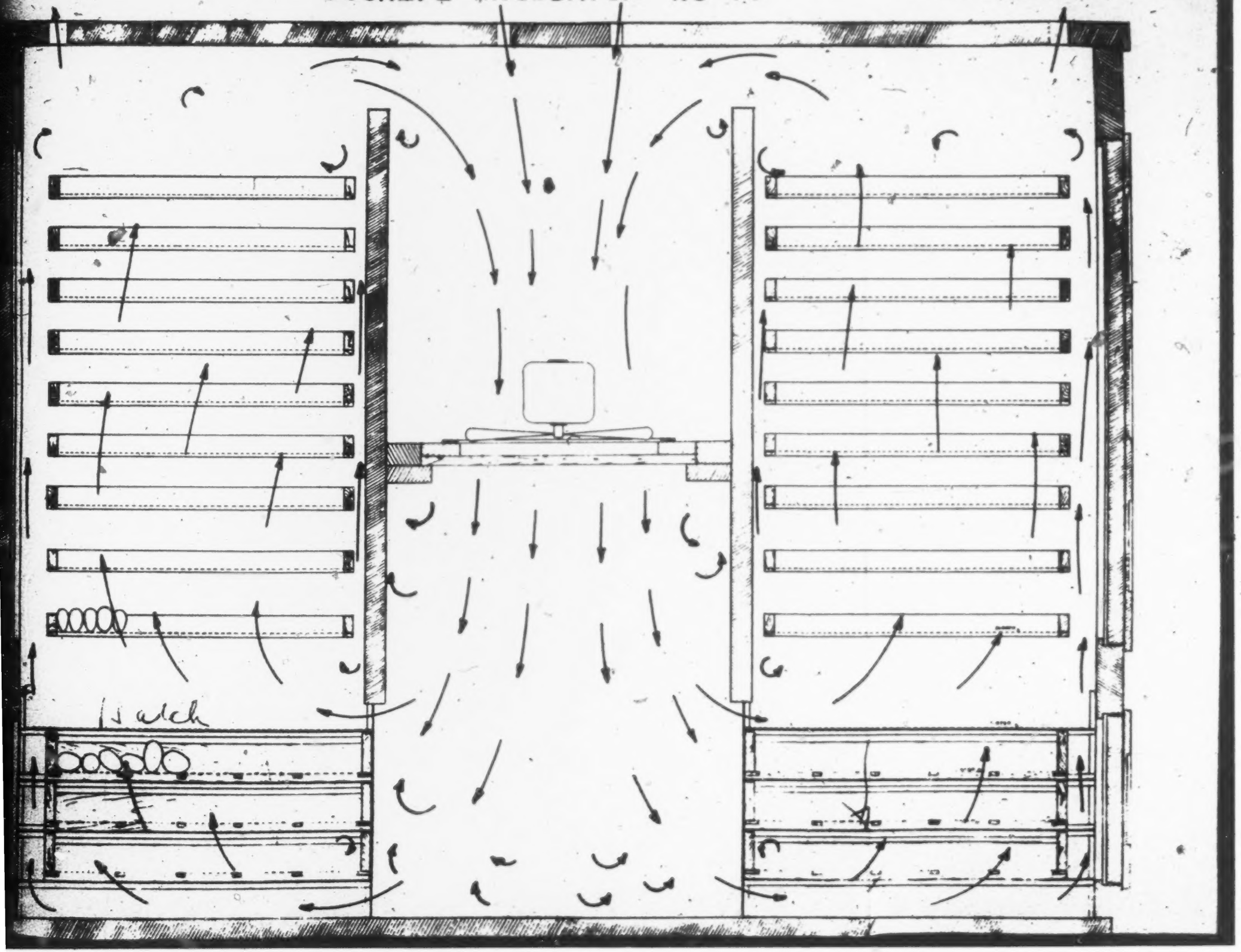


Sectional view in plane parallel to corridor and midway between front and rear of trays.

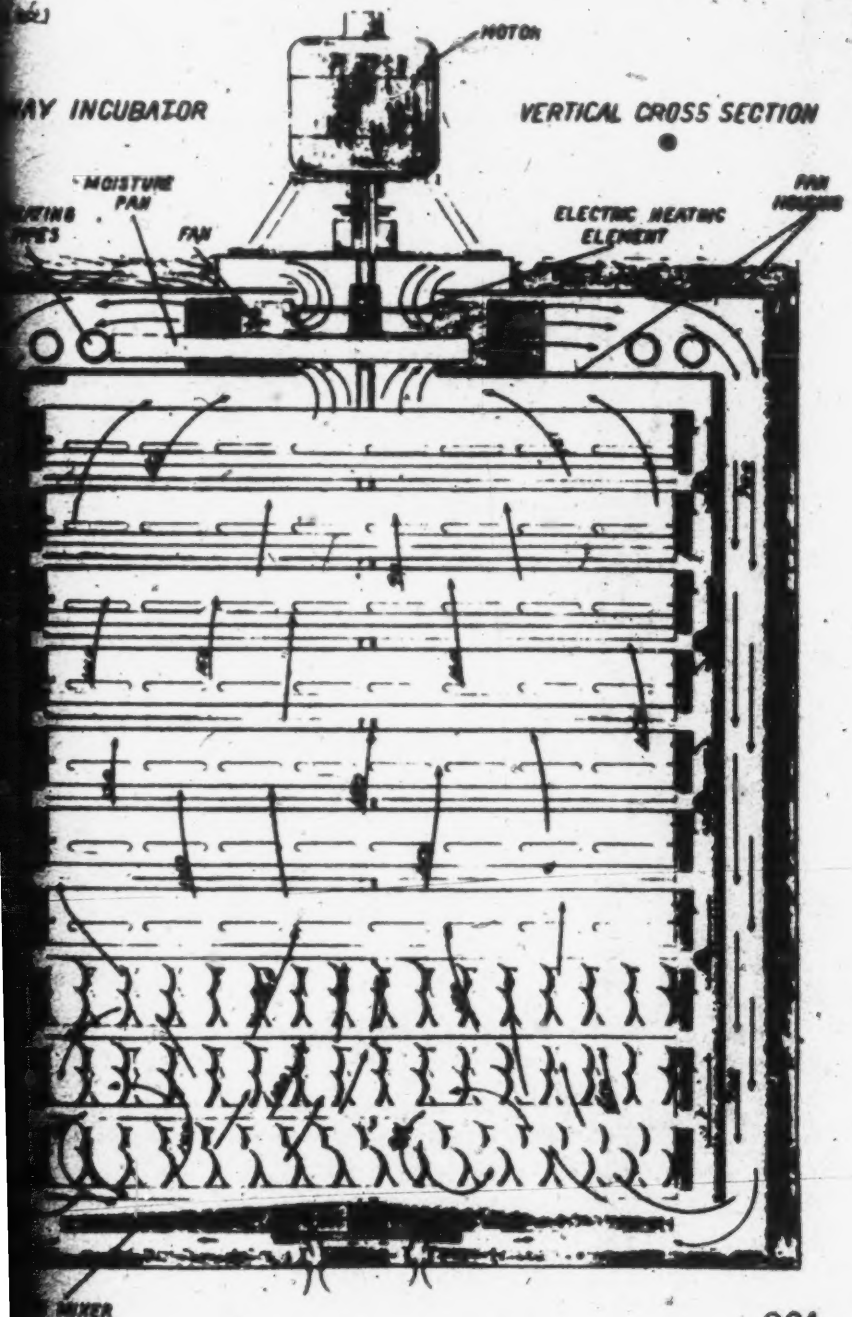
Arrows show general direction of air currents.

Numbers give approximate speed of air currents as recorded by anemometer.(Biram). Air which passes from corridor under lower two trays goes through the trays to space above. In upper twelve trays a very small per cent of the air which has come from the corridor passes through the tray. The large portion of it goes up the air columns between the trays.

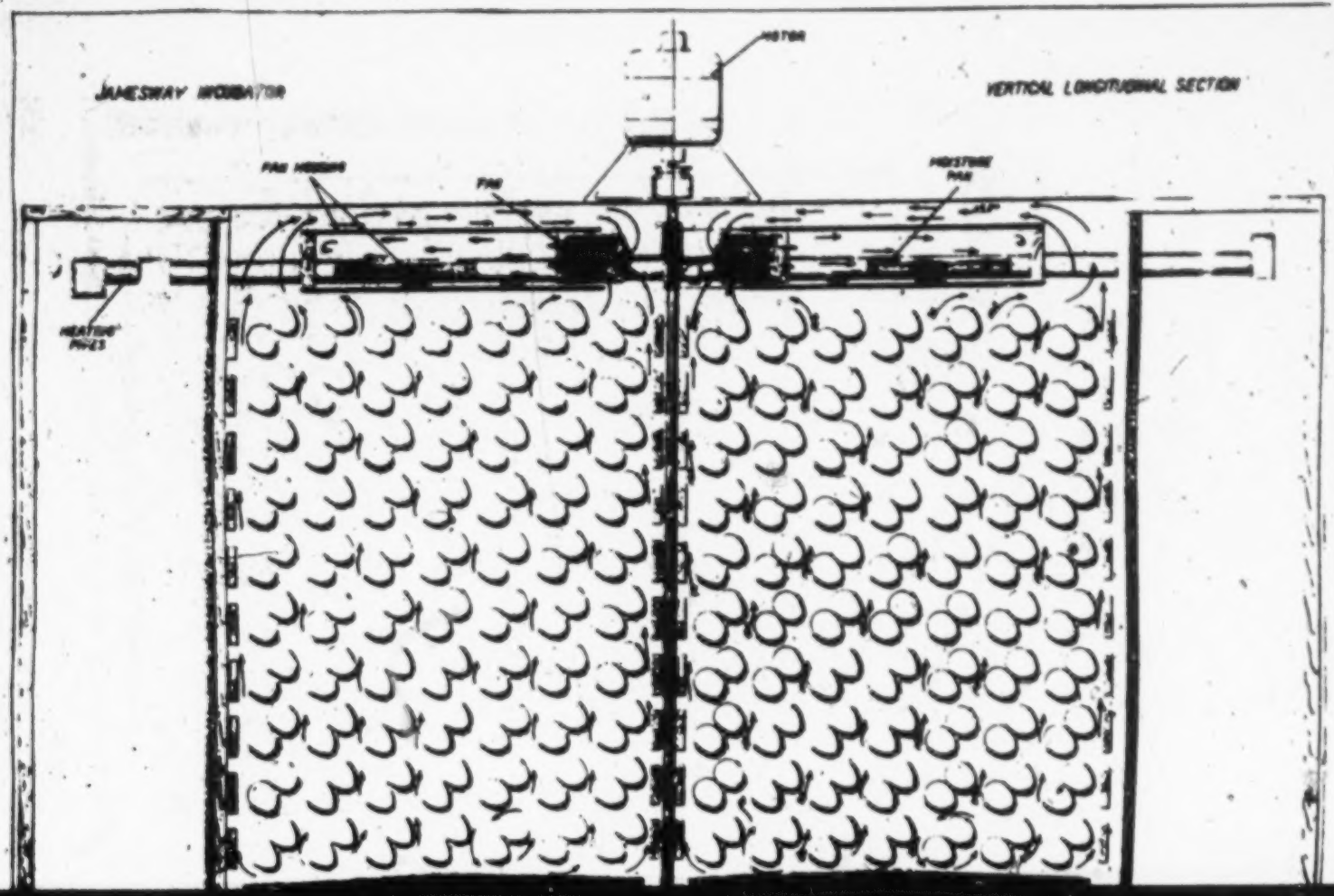
BUCKEYE INCUBATOR NO 48



PLAINTIFF'S EXHIBIT No. 14



964



PLAINTIFF'S EXHIBIT No. 15

PLAINTIFF'S EXHIBIT No. 24

686

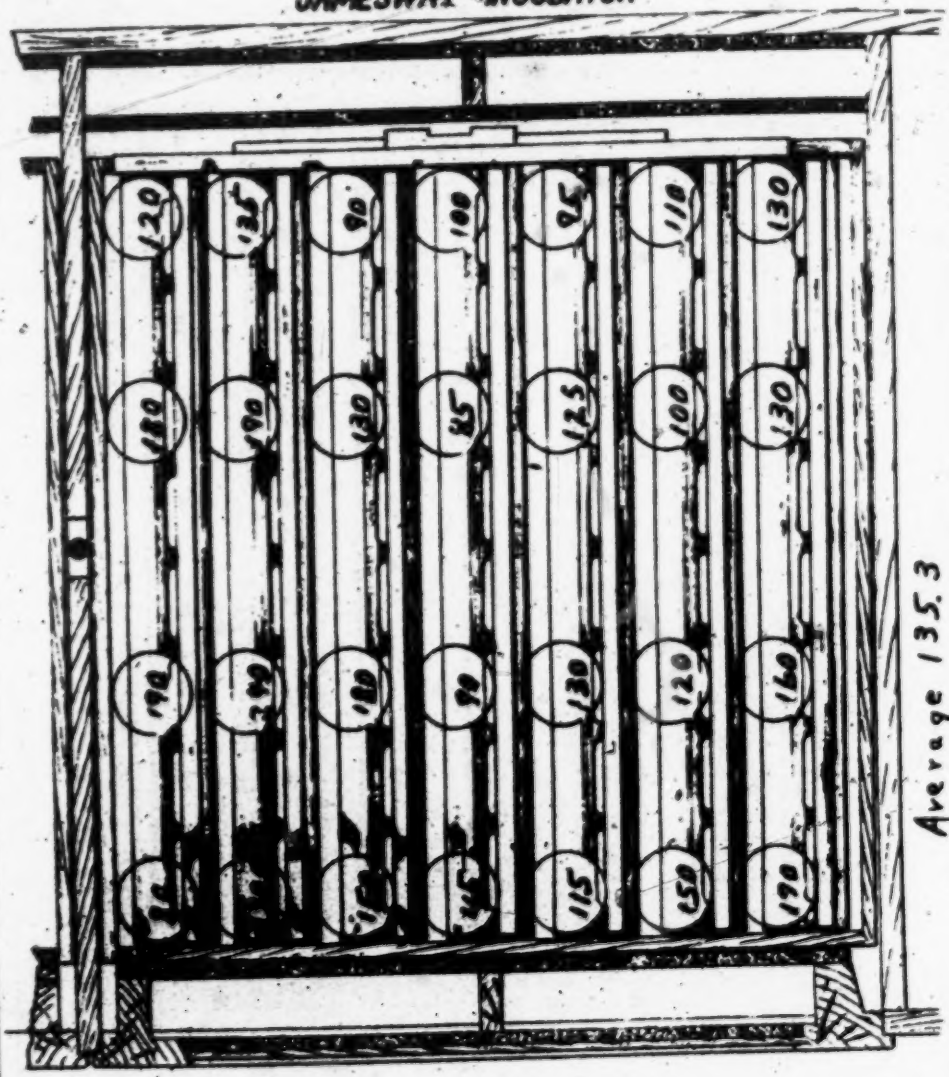
Exh 24 (10 sheets marked 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)

JAMESWAY INCUBATOR

966

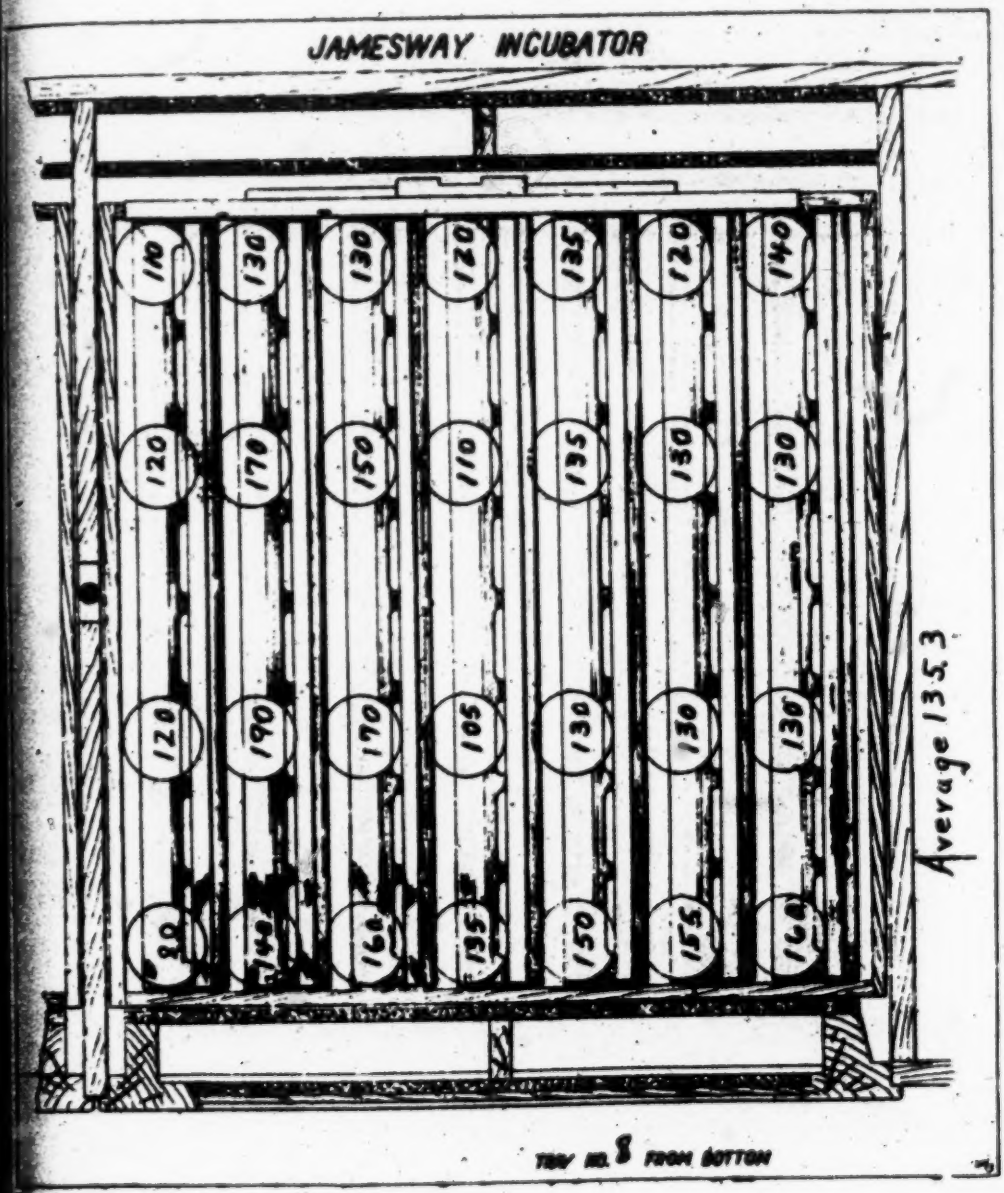
687

JAMESWAY INCUBATOR



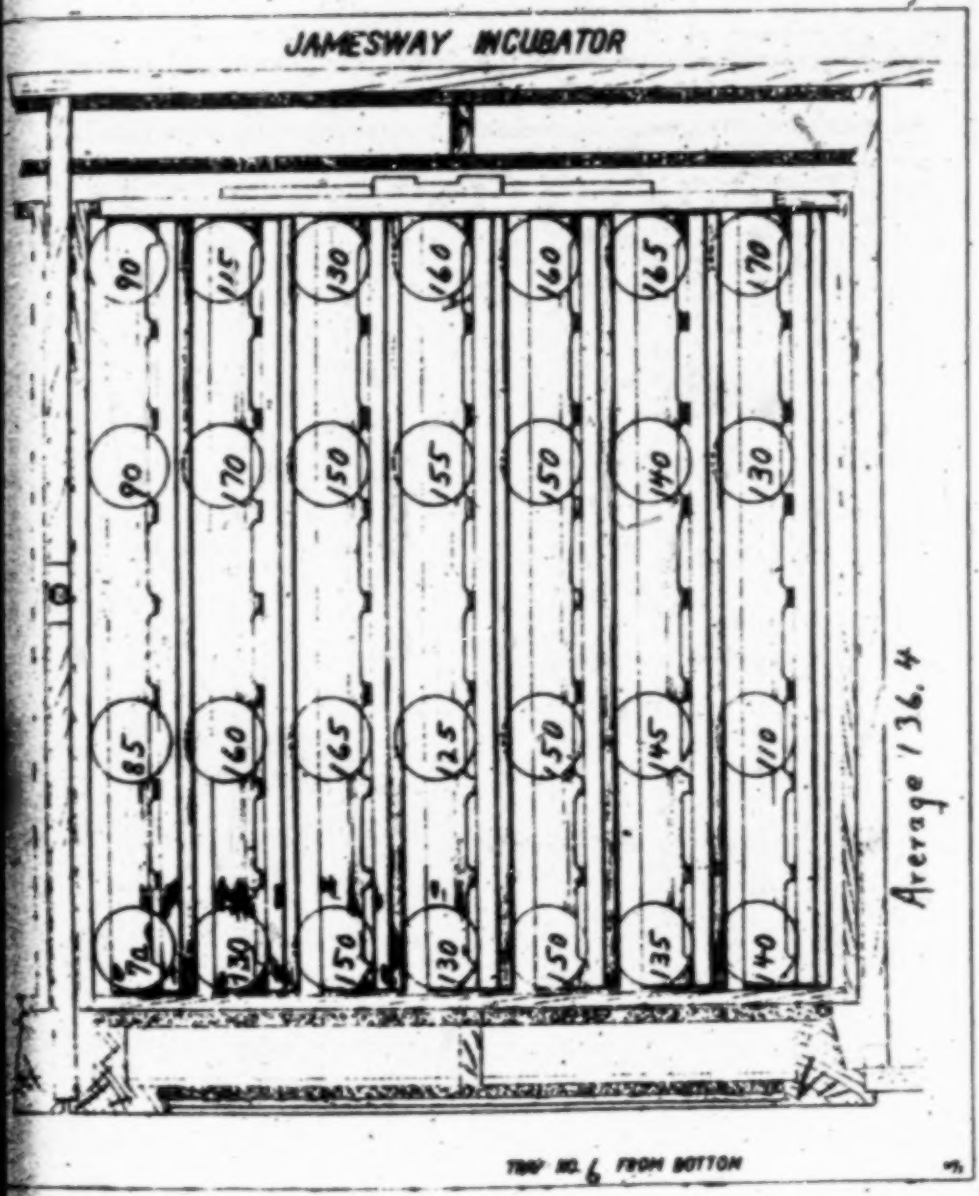
TRAY NO. 9 FROM BOTTOM

967

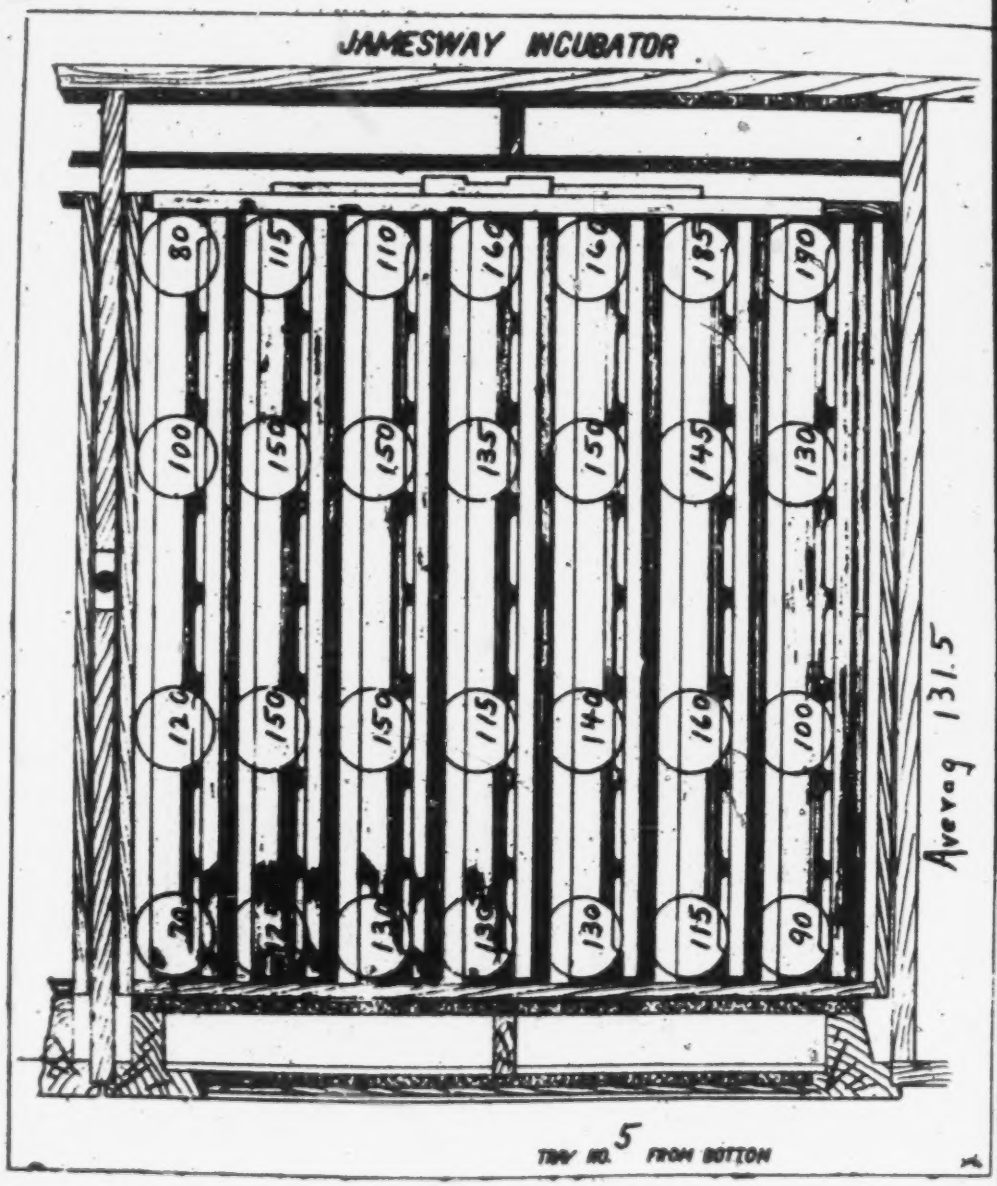

JAMESWAY INCUBATOR
110
130
130
120
135
120
140
120
170
150
110
135
130
130
120
190
170
105
130
130
130
20
140
160
135
150
155
160
Average 135.3
TRAY NO. 8 FROM BOTTOM

JAMESWAY INCUBATOR

TRAY NO. 9 FROM BOTTOM

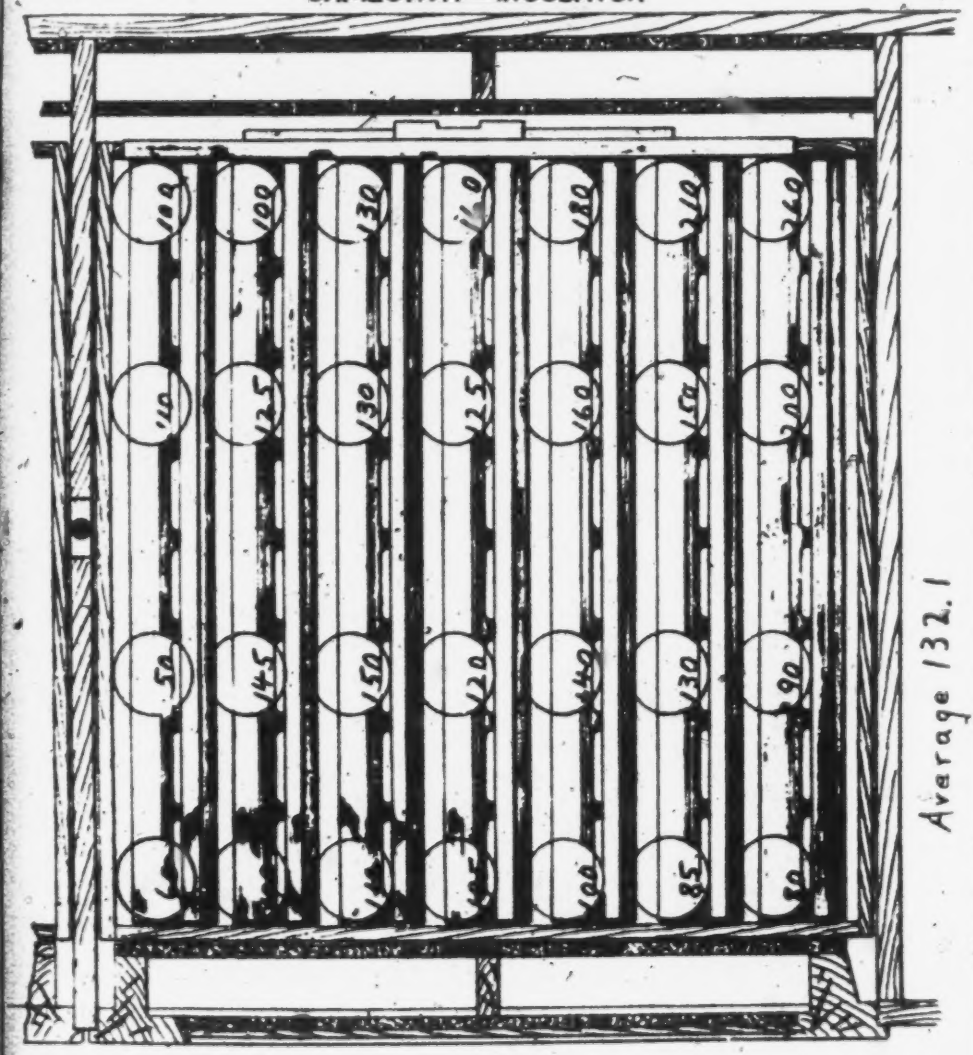

JAMESWAY INCUBATOR
90 115 130 160 160 165 170
90 170 150 155 150 140 130
85 160 165 125 150 145 110
70 130 150 130 150 135 140
Average 136.4
TRAY NO. 6 FROM BOTTOM

691


JAMESWAY INCUBATOR
80
115
110
160
160
185
190
100
150
150
135
150
145
130
120
150
150
115
140
160
100
20
130
130
130
115
90
Average 131.5
TRAY NO. 5 FROM BOTTOM

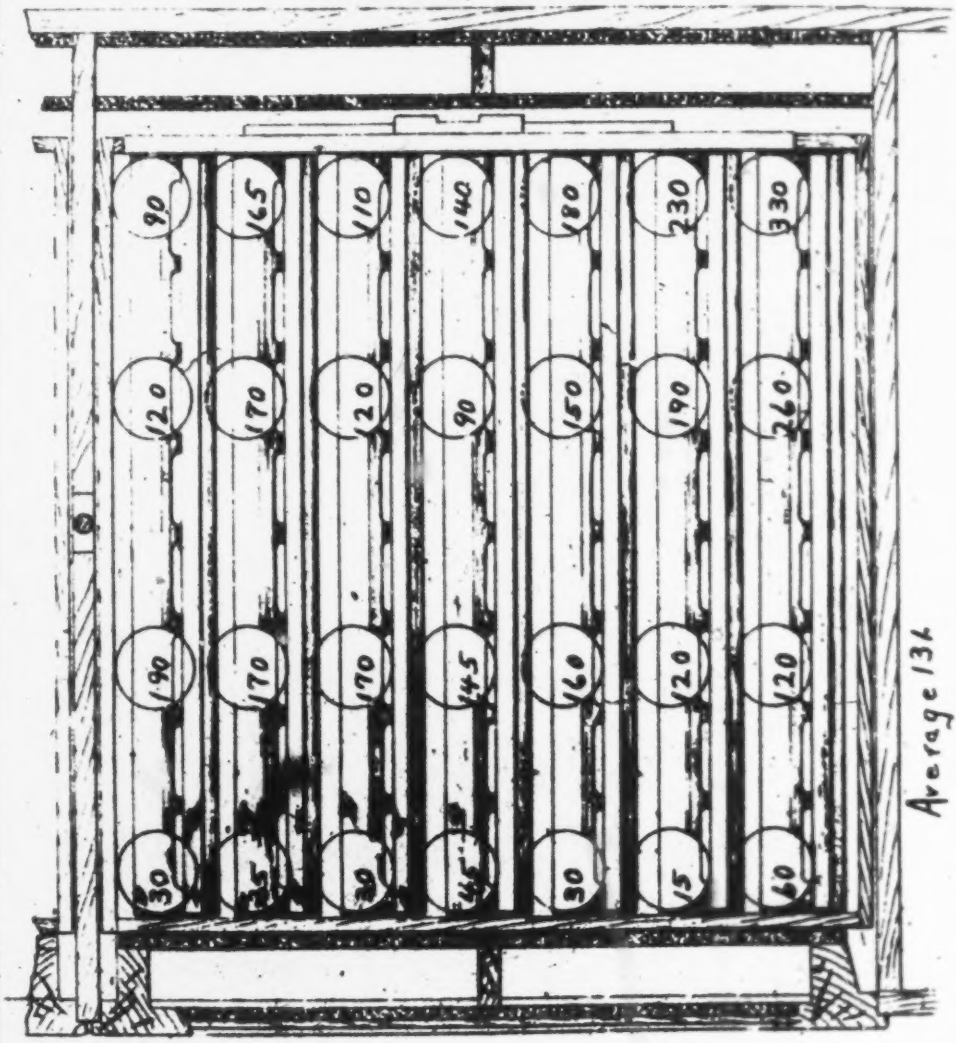
971

JAMESWAY INCUBATOR



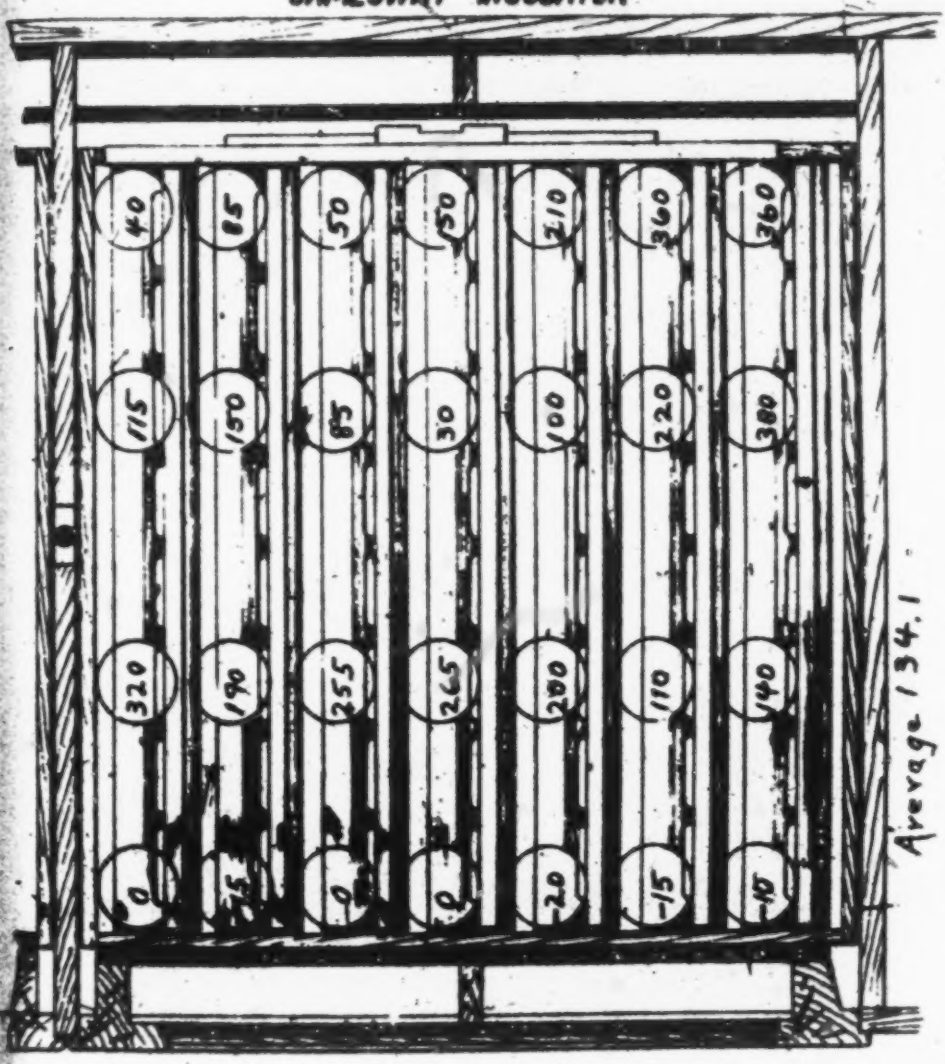
TRAY NO. 4 FROM BOTTOM

JAMESWAY INCUBATOR



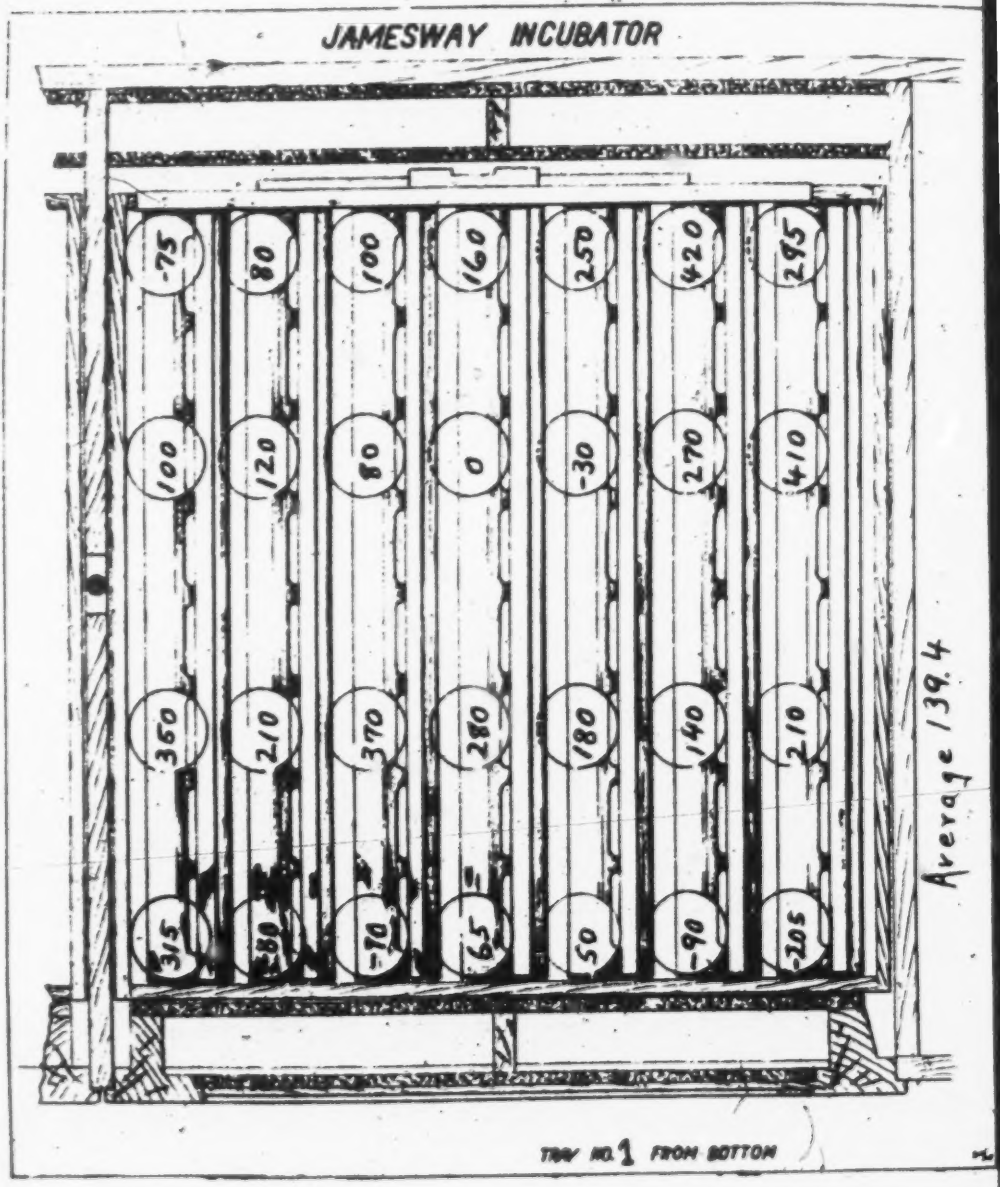
TRAY NO. 3 FROM BOTTOM

JAMESWAY INCUBATOR



TRAY NO. 2 FROM BOTTOM

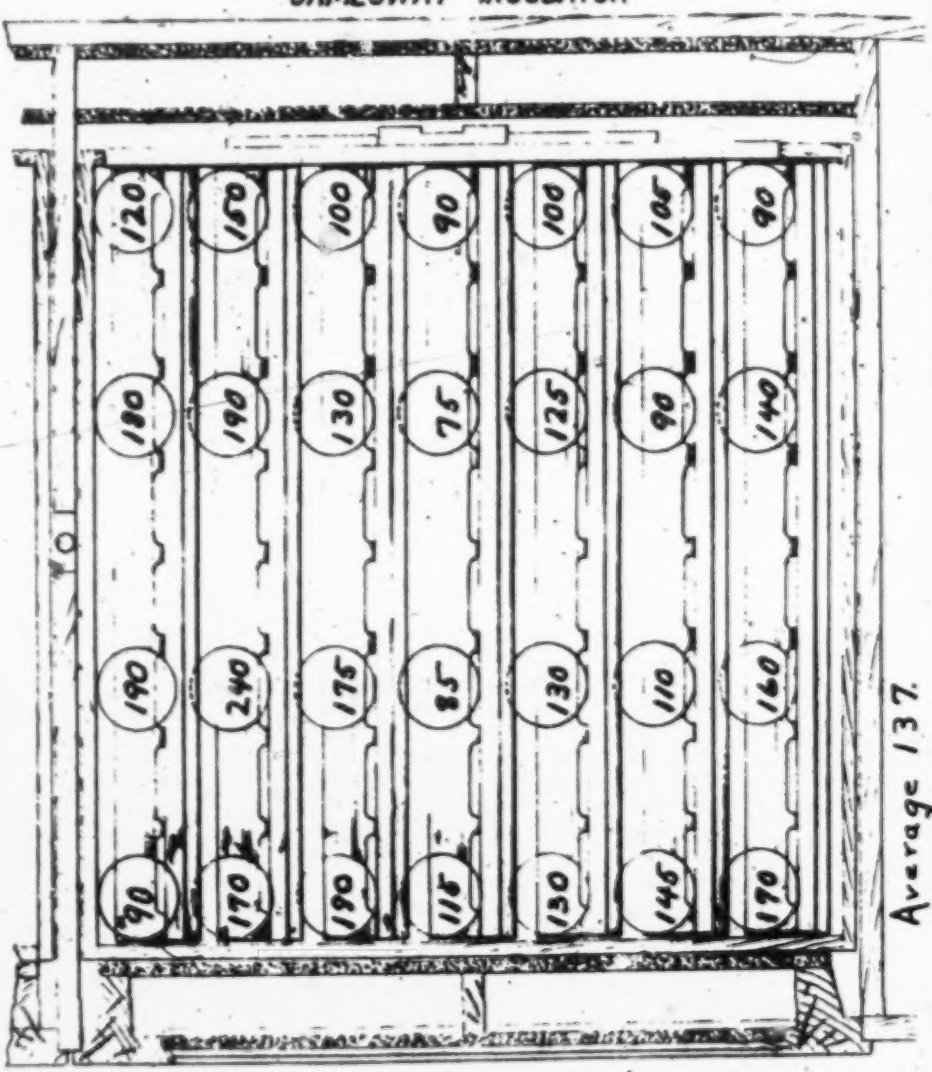
695


JAMESWAY INCUBATOR
-75
80
100
160
250
420
295
100
120
80
0
-30
270
410
360
210
370
280
180
140
210
315
-80
-70
65
50
-90
-205
Average 139.4
TRAY NO. 1 FROM BOTTOM

975

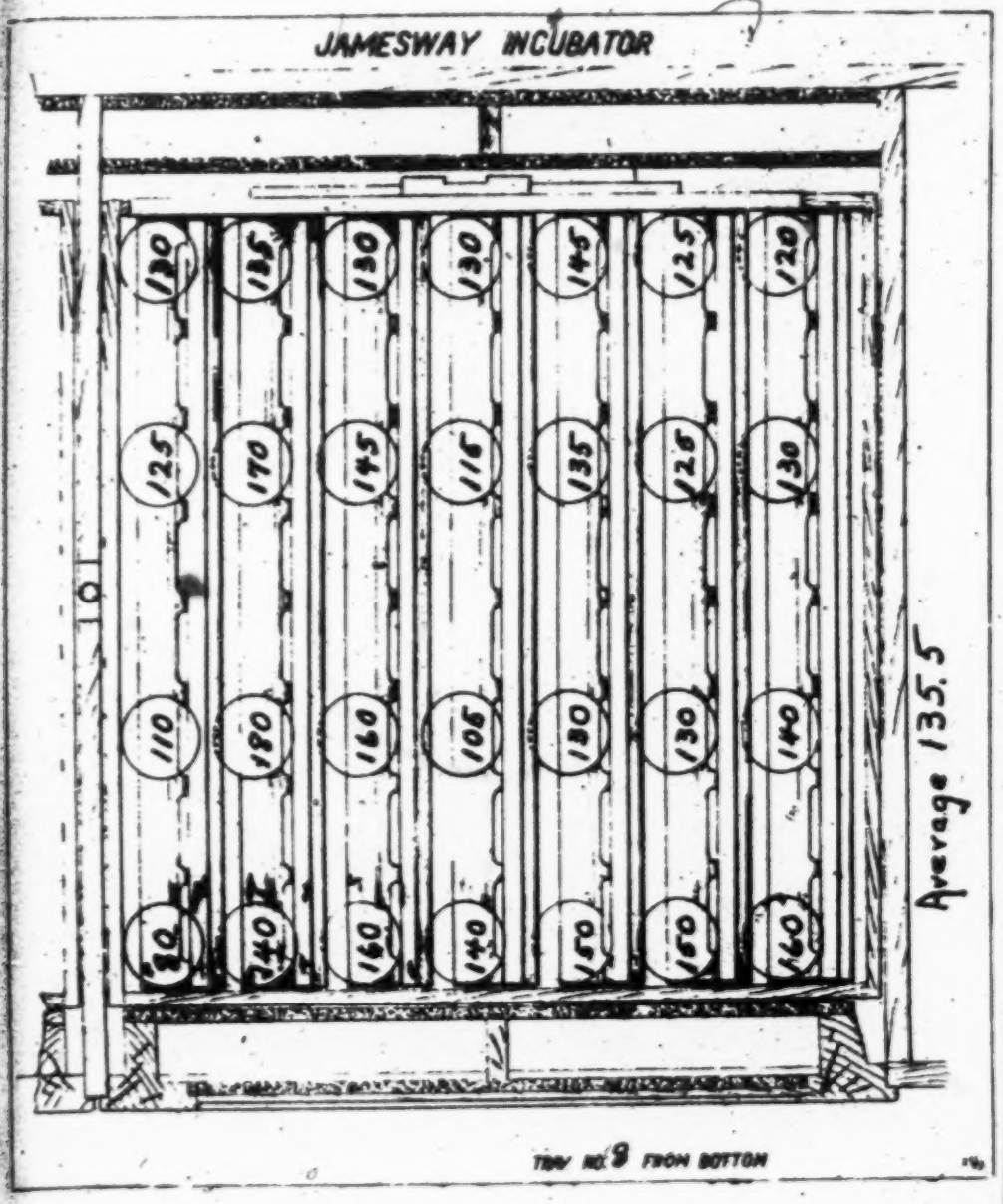
PLAINTIFF'S EXHIBIT No. 25

JAMESWAY INCUBATOR

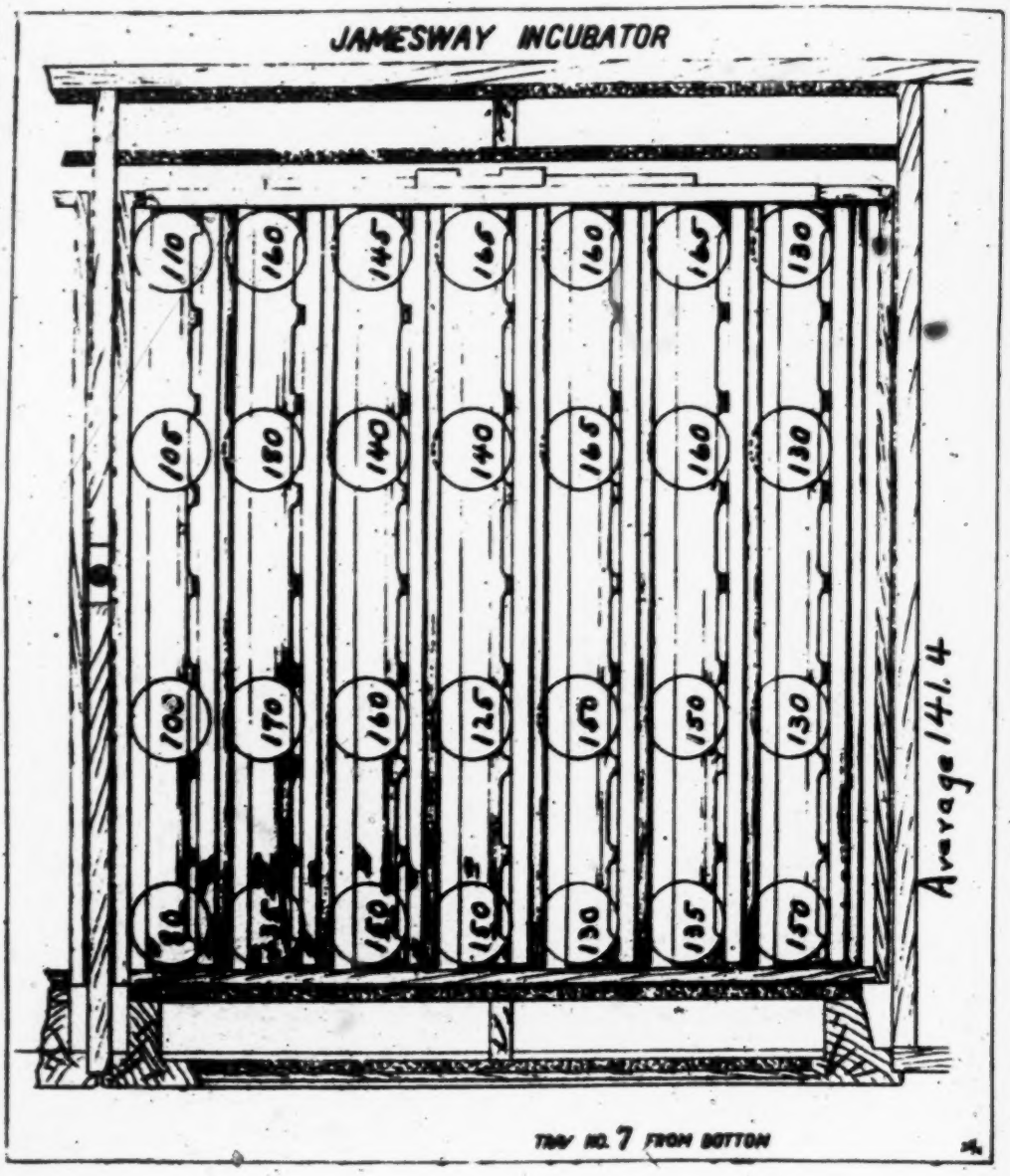


TRAY NO. 9 FROM BOTTOM

977


JAMESWAY INCUBATOR
120 135 130 130 145 125 120
125 170 145 115 135 125 130
110 180 160 105 180 130 140
130 140 160 140 150 150 160
Average 135.5
TRAY NO. 9 FROM BOTTOM

699


JAMESWAY INCUBATOR
110
160
145
165
160
165
130
105
150
140
140
165
160
130
100
170
160
125
150
150
130
90
135
150
150
130
135
150
Average 141.4
TRAY NO. 7 FROM BOTTOM

979

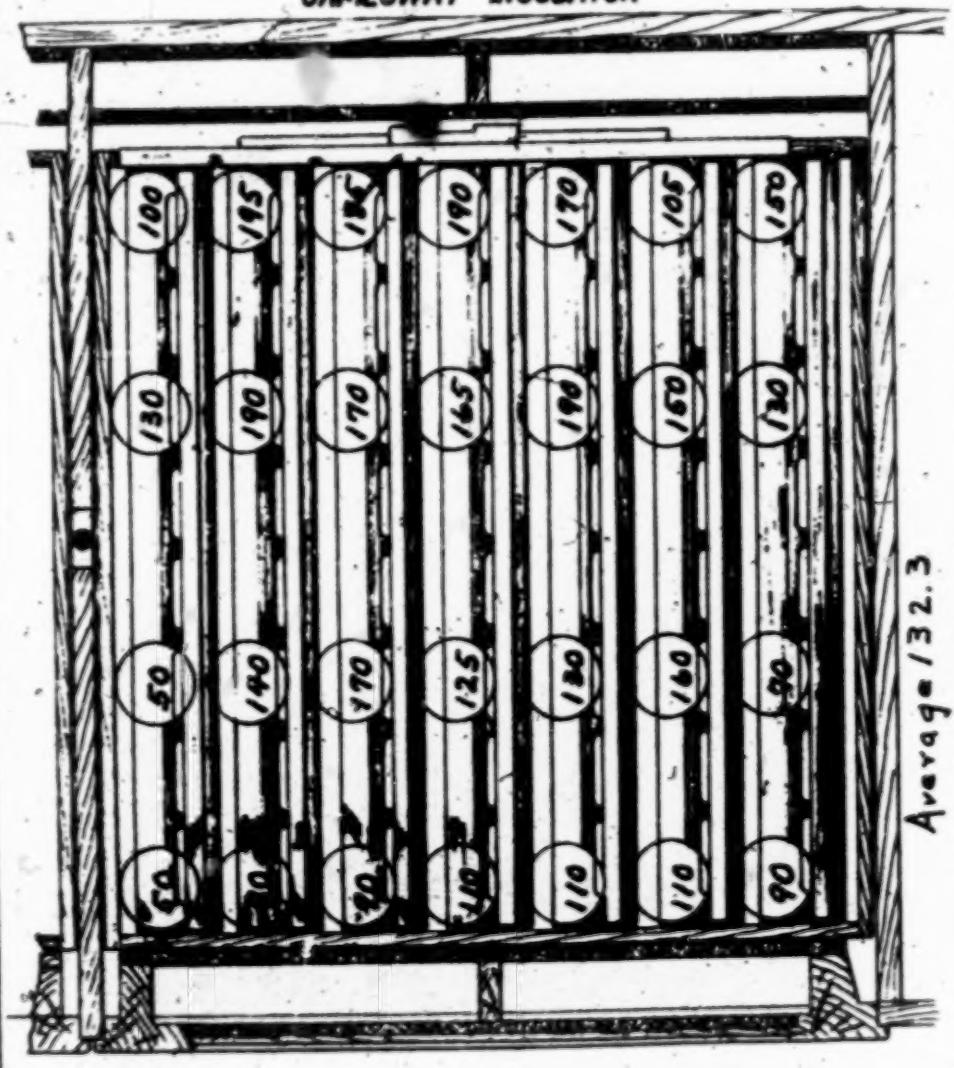
700

JAMESWAY INCUBATOR

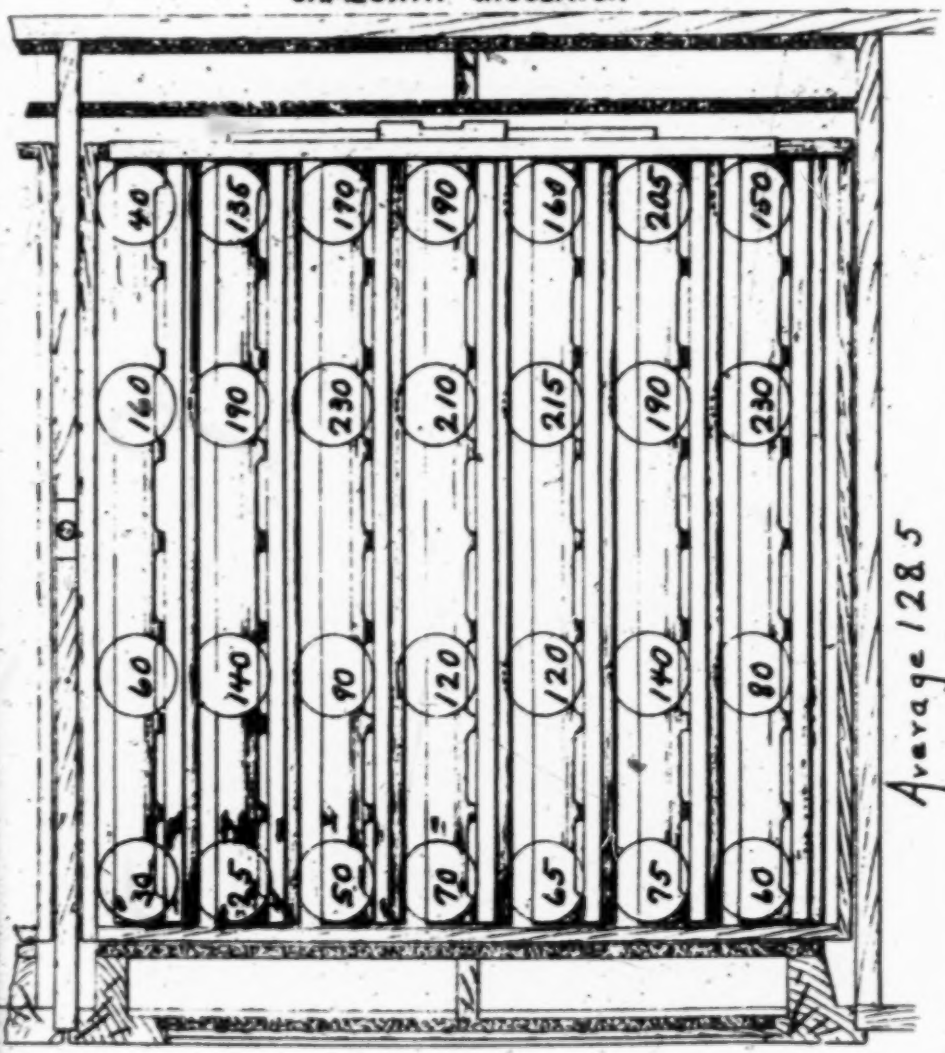
TRAY NO. 6 FROM BOTTOM

980

JAMESWAY INCUBATOR



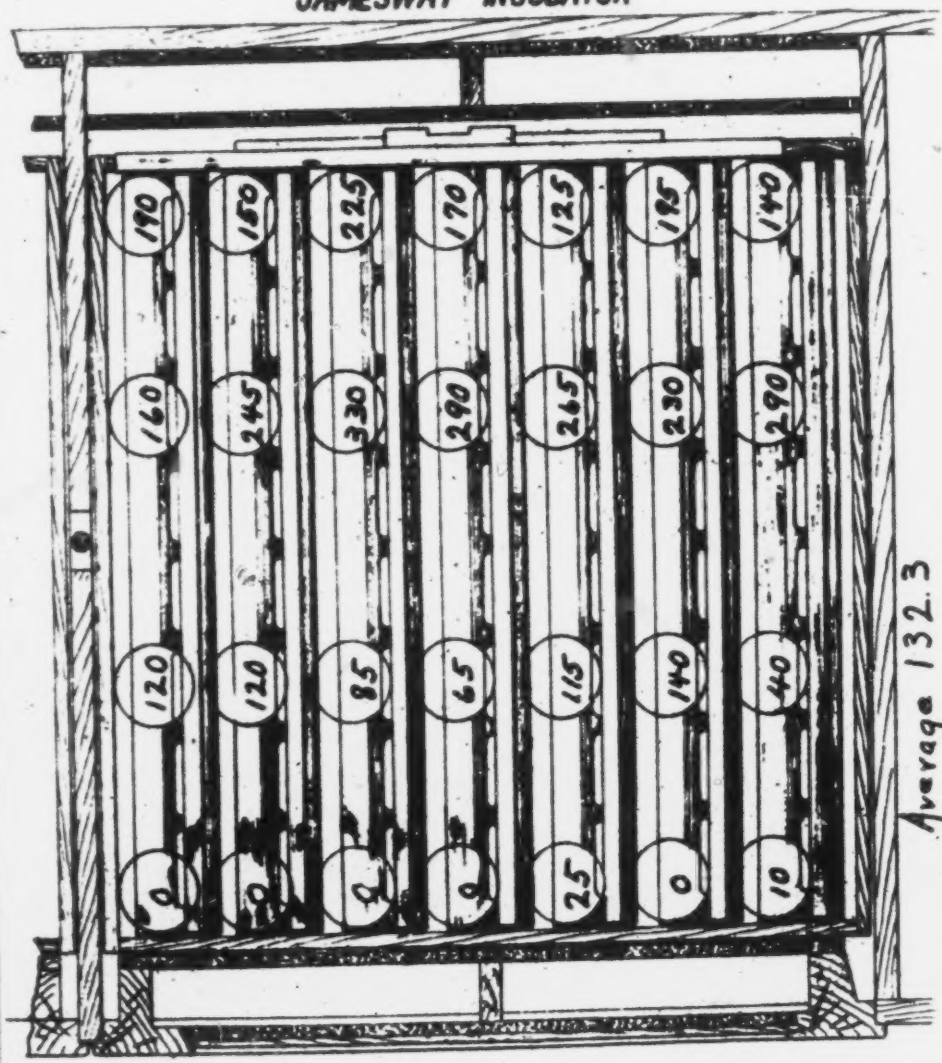
JAMESWAY INCUBATOR



Average 1285

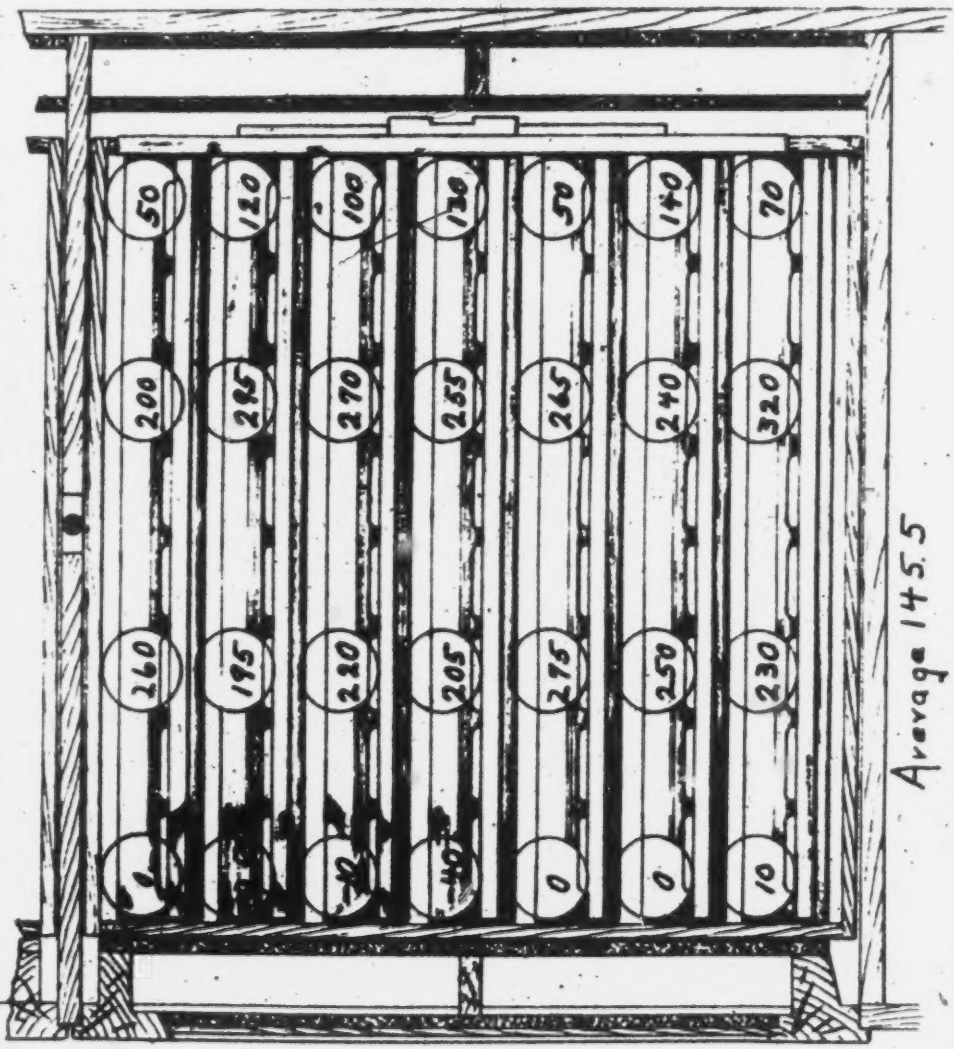
TRAY NO. 4 FROM BOTTOM

JAMESWAY INCUBATOR



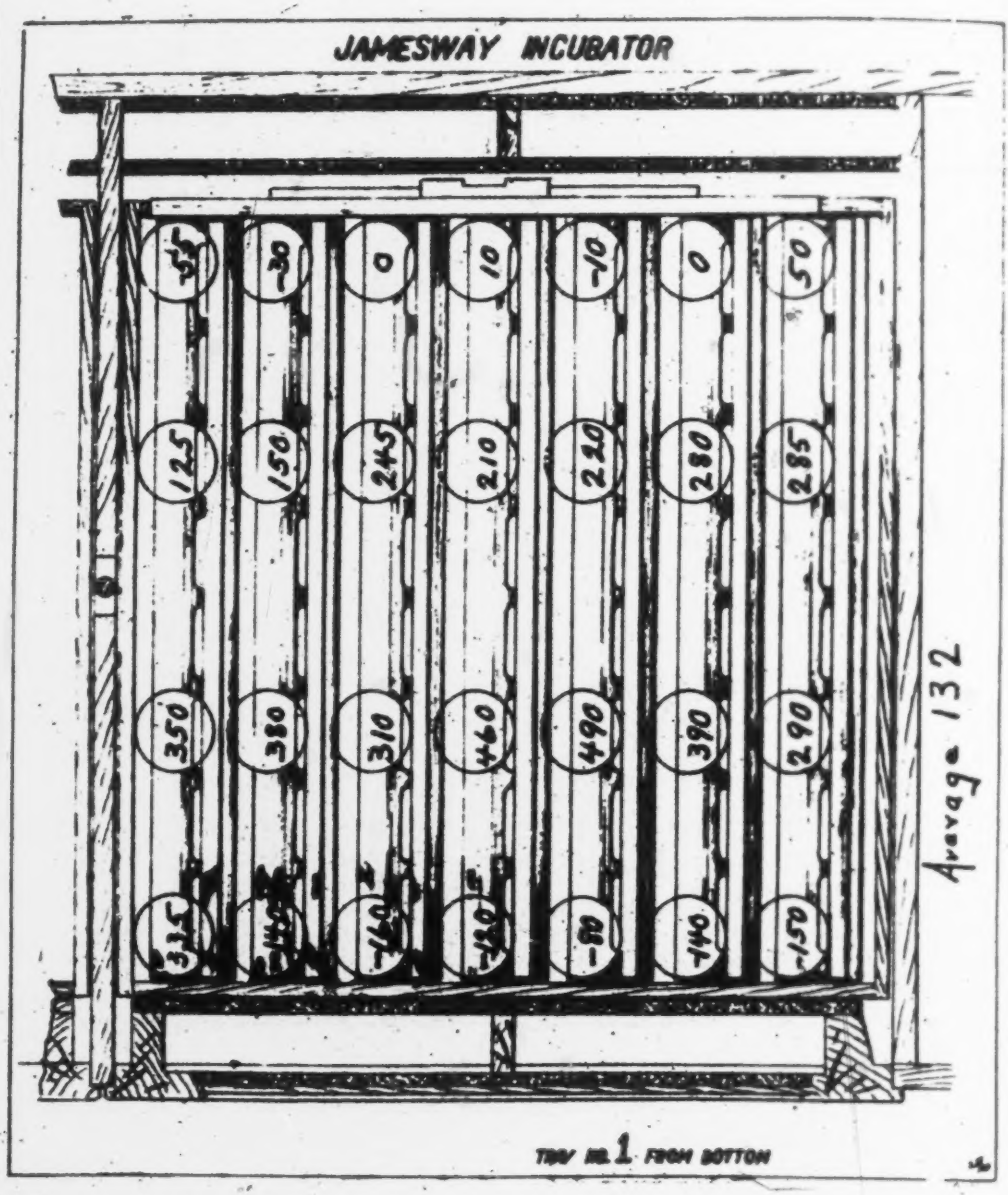
TRAY NO. 3 FROM BOTTOM

JAMESWAY INCUBATOR



TRAY NO. 2 FROM BOTTOM

705

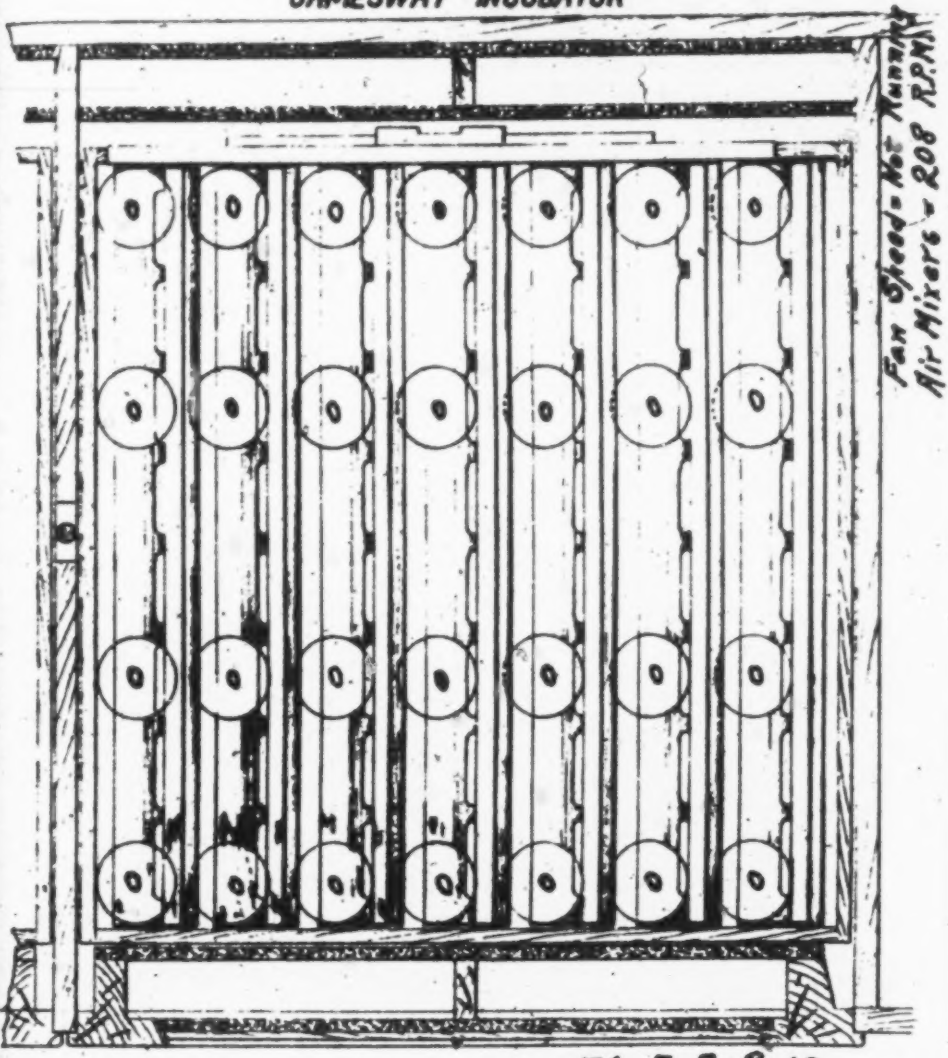

JAMESWAY INCUBATOR
-55
-30
0
10
-10
0
50
125
150
245
210
220
280
285
350
380
310
460
490
390
290
-135
-140
-140
-140
-80
-140
-150
Average 132
TRAY NO. 1 FROM BOTTOM

985

PLAINTIFF'S EXHIBIT No. 88

706

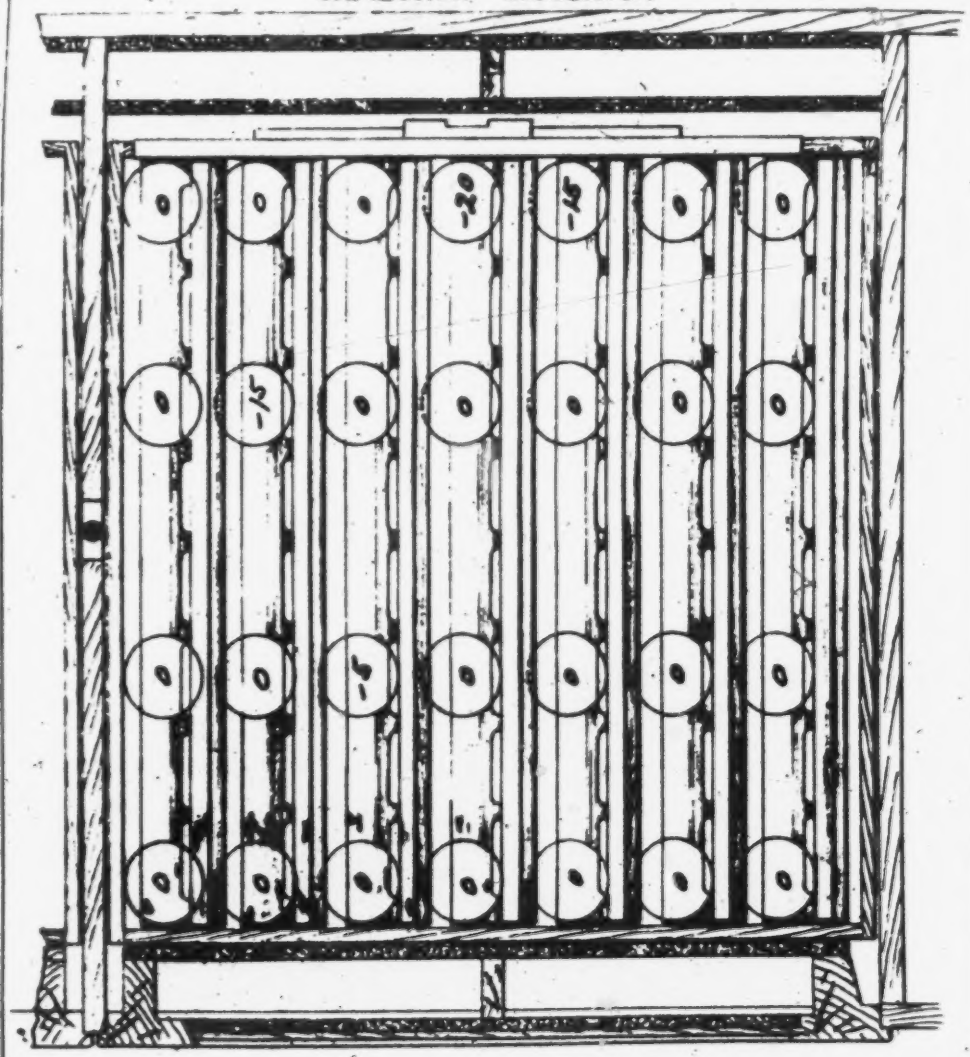
JAMESWAY INCUBATOR



986

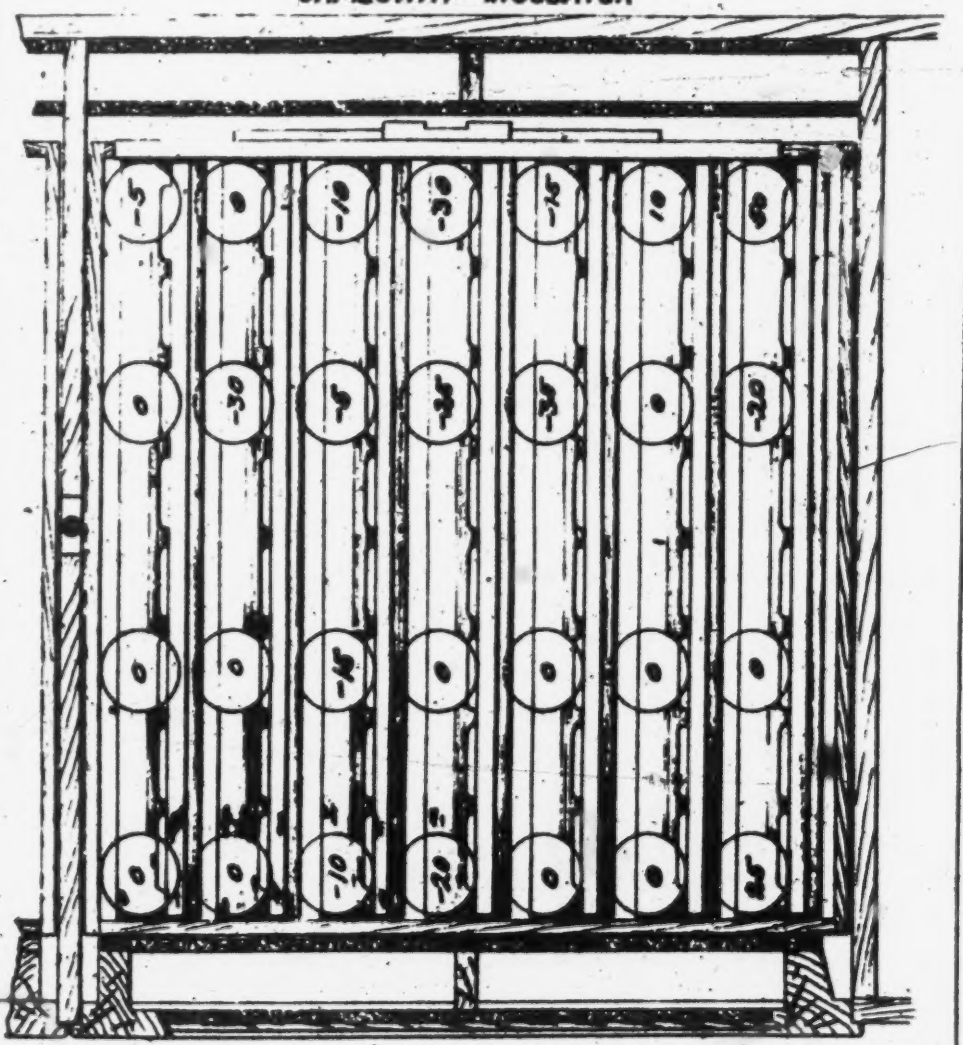
707

JAMESWAY INCUBATOR



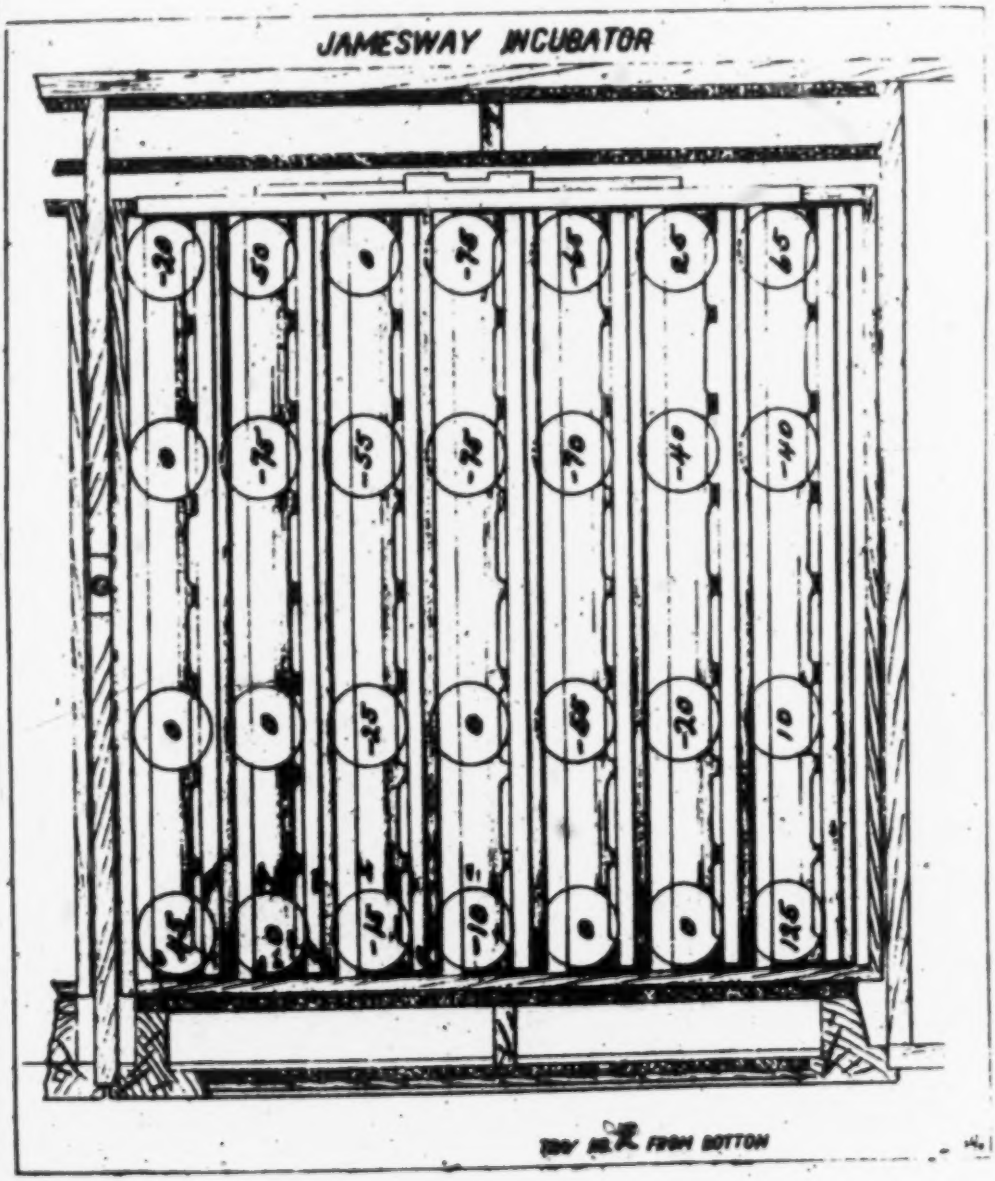
987

JAMESWAY INCUBATOR

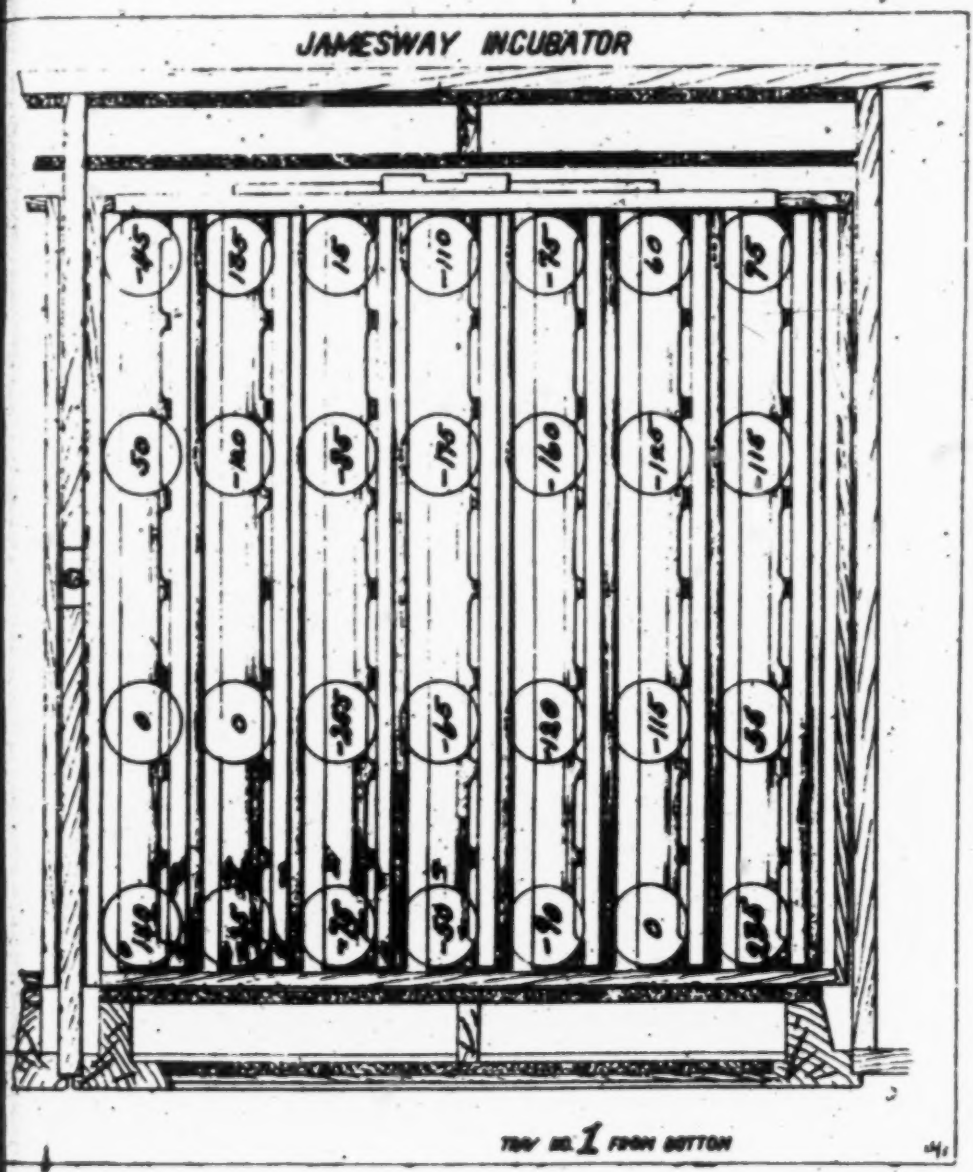


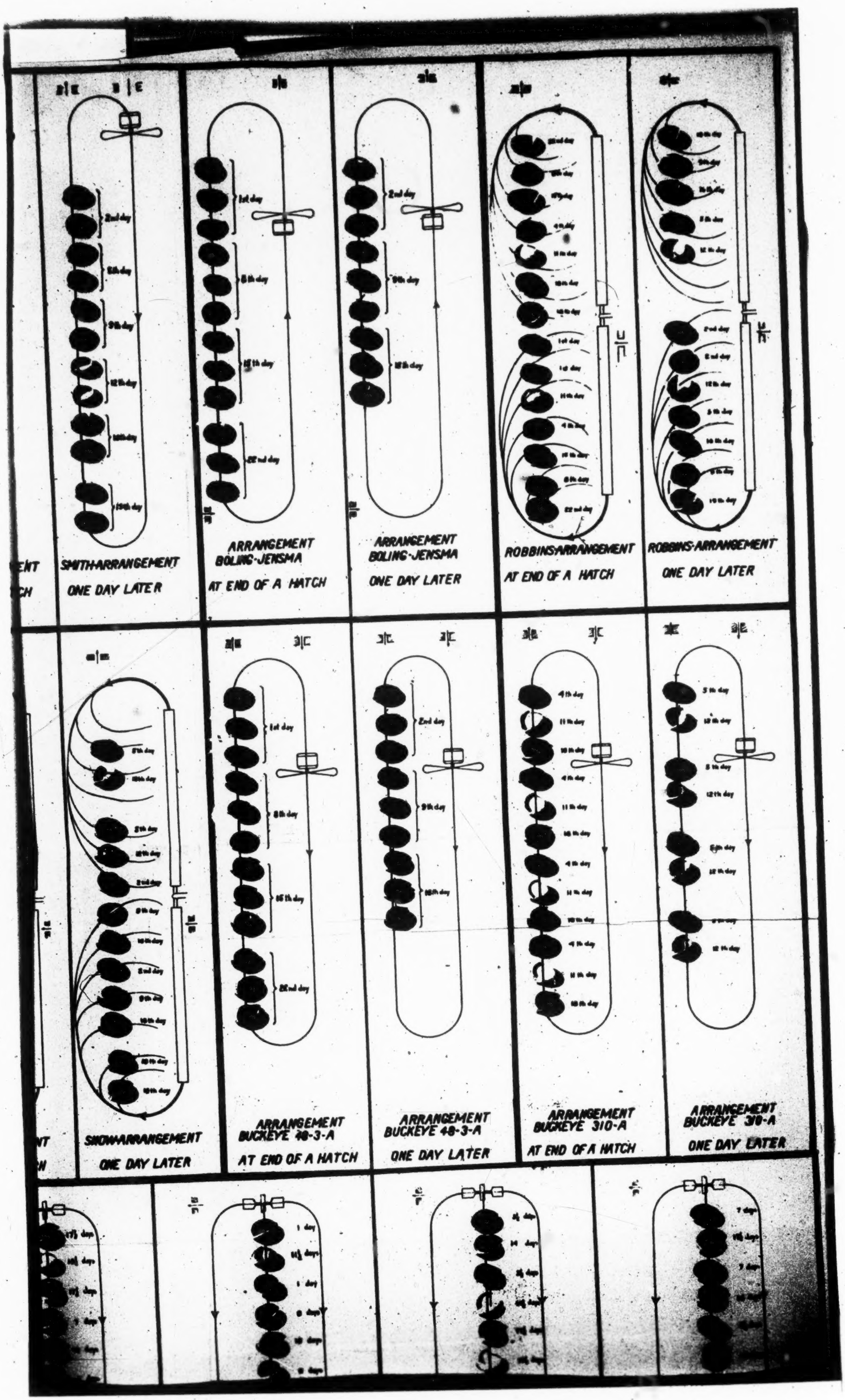
TRAY NO. 3 FROM BOTTOM

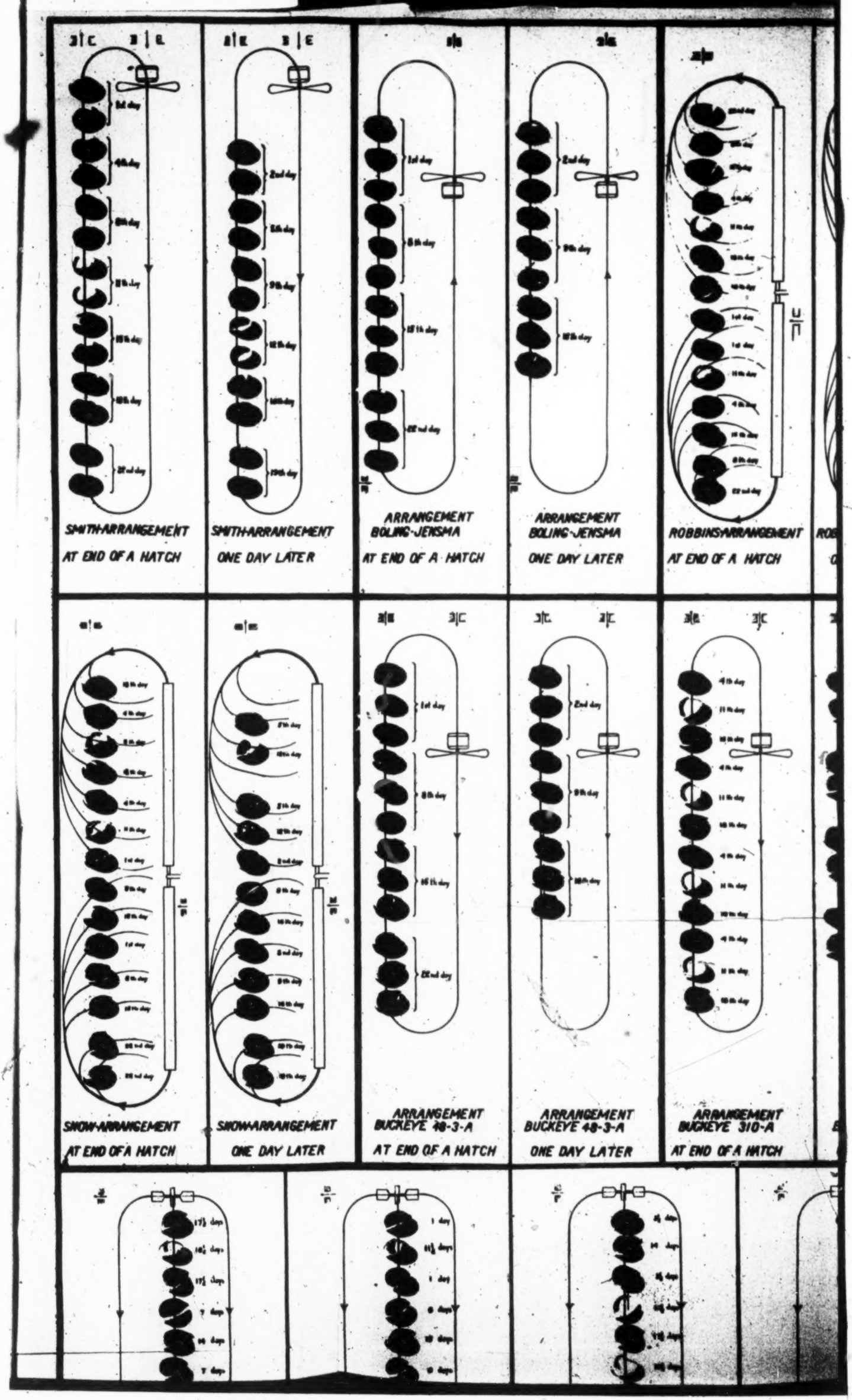
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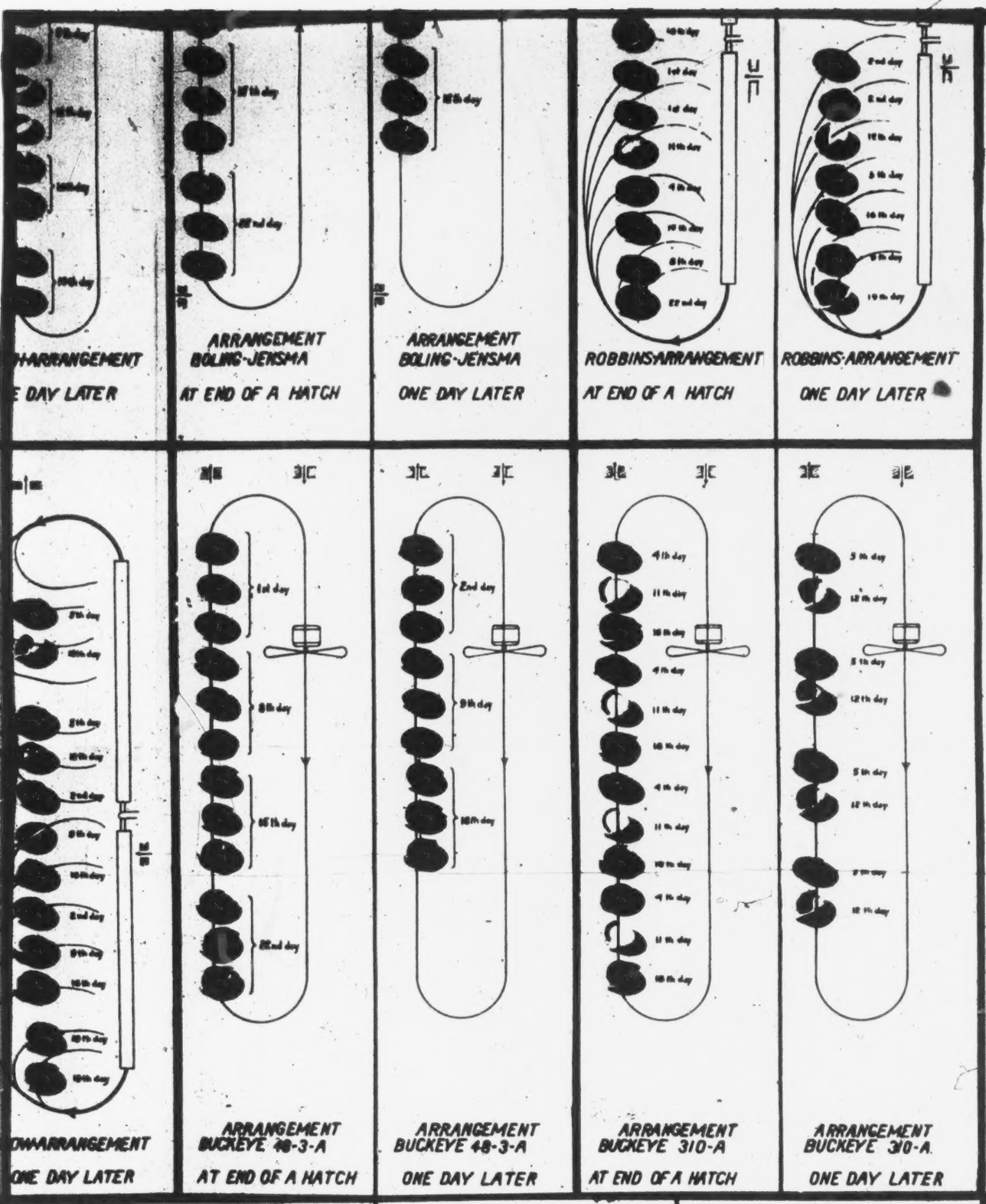


989


JAMESWAY INCUBATOR
TRAY NO. 1 FROM BOTTOM


SMITH-ARRANGEMENT
ONE DAY LATER
ARRANGEMENT
BOLING-JENSMA
AT END OF A HATCH
ARRANGEMENT
BOLING-JENSMA
ONE DAY LATER
ROBBINS-ARRANGEMENT
AT END OF A HATCH
ROBBINS-ARRANGEMENT
ONE DAY LATER
SHOWARRANGEMENT
ONE DAY LATER
ARRANGEMENT
BUCKEYE 48-3-A
AT END OF A HATCH
ARRANGEMENT
BUCKEYE 48-3-A
ONE DAY LATER
ARRANGEMENT
BUCKEYE 310-A
AT END OF A HATCH
ARRANGEMENT
BUCKEYE 310-A
ONE DAY LATER


SMITH-ARRANGEMENT
AT END OF A HATCH
SMITH-ARRANGEMENT
ONE DAY LATER
ARRANGEMENT
BOLING-JENSMA
AT END OF A HATCH
ARRANGEMENT
BOLING-JENSMA
ONE DAY LATER
ROBBINS-ARRANGEMENT
AT END OF A HATCH
SHOW-ARRANGEMENT
AT END OF A HATCH
SHOW-ARRANGEMENT
ONE DAY LATER
ARRANGEMENT
BUCKEYE 48-3-A
AT END OF A HATCH
ARRANGEMENT
BUCKEYE 48-3-A
ONE DAY LATER
ARRANGEMENT
BUCKEYE 310-A
AT END OF A HATCH



...HARRANGEMENT
...E DAY LATER

ARRANGEMENT
BOLING-JENSMA
AT END OF A HATCH

ARRANGEMENT
BOLING-JENSMA
ONE DAY LATER

ROBBINS ARRANGEMENT
AT END OF A HATCH

ROBBINS ARRANGEMENT
ONE DAY LATER

...OWARRANGEMENT
...ONE DAY LATER

ARRANGEMENT
BUCKEYE 48-3-A
AT END OF A HATCH

ARRANGEMENT
BUCKEYE 48-3-A
ONE DAY LATER

ARRANGEMENT
BUCKEYE 310-A
AT END OF A HATCH

ARRANGEMENT
BUCKEYE 310-A
ONE DAY LATER

...ENT

JAMESWAY ARRANGEMENT
ONE DAY LATER

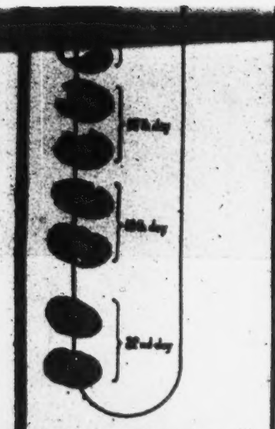
JAMESWAY ARRANGEMENT
2½ DAYS LATER

JAMESWAY ARRANGEMENT
ONE WEEK LATER

BLUE-ENDOTHERMIC EGGS RED-EXOTHERMIC EGGS

EGG ARRANGEMENT CHART

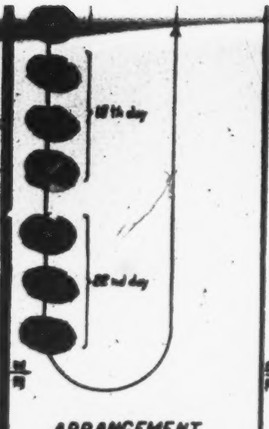
PLAINTIFF'S EXHIBIT NO. 694



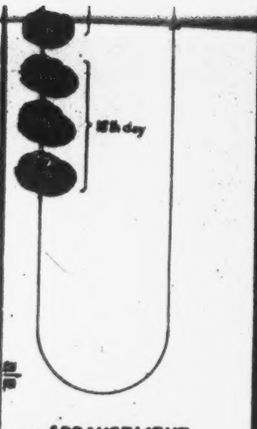
SMITH-ARRANGEMENT
AT END OF A HATCH



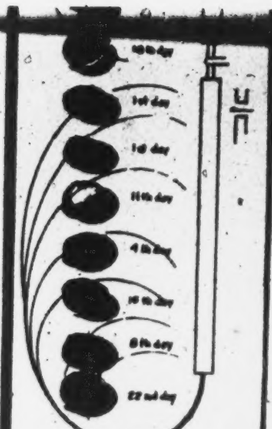
SMITH-ARRANGEMENT
ONE DAY LATER



ARRANGEMENT
BOLING-JENSMA
AT END OF A HATCH

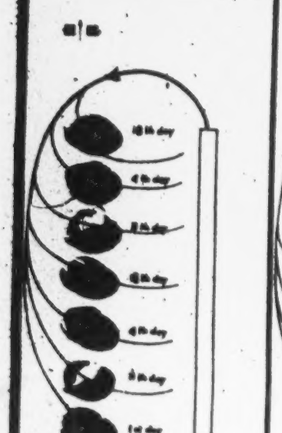


ARRANGEMENT
BOLING-JENSMA
ONE DAY LATER

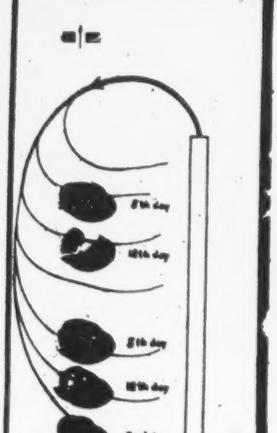


ROBBINS-ARRANGEMENT
AT END OF A HATCH

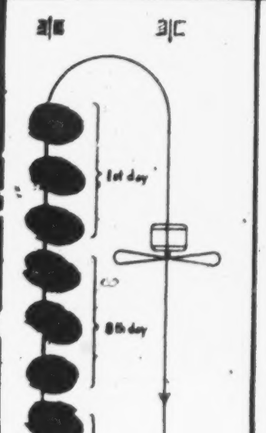




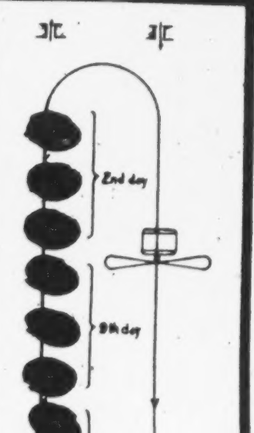
SNOW-ARRANGEMENT
AT END OF A HATCH



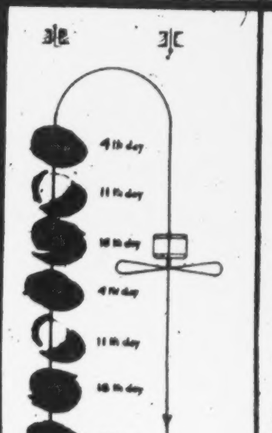
SNOW-ARRANGEMENT
ONE DAY LATER



ARRANGEMENT
BUCKEYE 48-3-A
AT END OF A HATCH

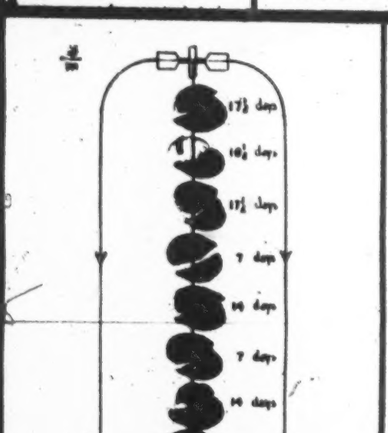


ARRANGEMENT
BUCKEYE 48-3-A
ONE DAY LATER

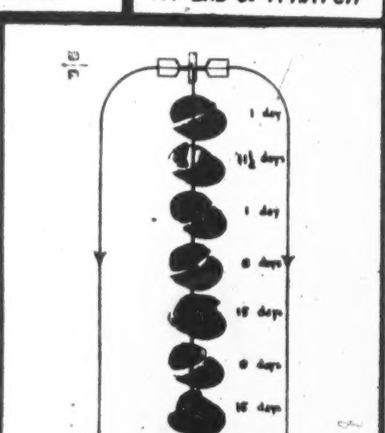


ARRANGEMENT
BUCKEYE 310-A
AT END OF A HATCH

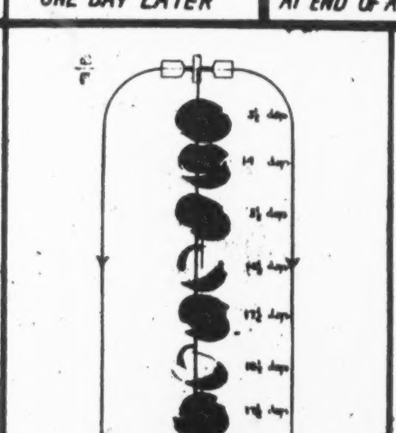




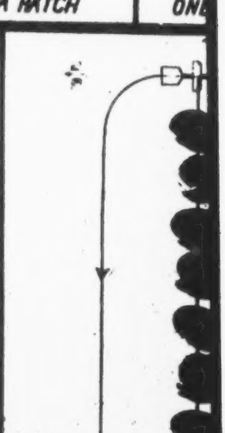
JAMESWAY ARRANGEMENT
AT END OF A HATCH



JAMESWAY ARRANGEMENT
ONE DAY LATER



JAMESWAY ARRANGEMENT
3½ DAYS LATER



JAMESWAY AR
ONE WEEK

BLUE-ENDOTHERMIC EGGS RED-EXOTHERMIC EGGS

EGG ARRANGEMENT CHART

PLAINTIFF'S EXHIBIT No. 28

To Hatch the Egg of the Domestic Fowl Requires the Following Environments:

1. A proper temperature must be maintained.
2. The moisture within the egg must be conserved.
3. Sufficient fresh air must be supplied for oxygen.
4. The egg must be turned from time to time.

Scientific study of the method of hatching used by the hen discloses that:

1. The eggs in her nest are all in the same stage of hatching.
2. The eggs are all arranged on one level.
3. The heat is applied from above.
4. The nest under the eggs is several degrees cooler than the hen's body.
5. The eggs are protected from drafts.
6. The eggs are cooled once or twice daily.
7. The temperature within the nest increases as the hatch progresses.
8. Moisture is conserved by restricting air movement.
9. The eggs are turned frequently by rolling or shuffling.

Incubators of the type in commercial use in 1915 follow the teachings of the hen in that:

1. The eggs in the incubator are all in the same stage of hatching.
2. The eggs are all arranged on one level.
3. The heat is applied from above.
4. The air below the eggs is several degrees cooler than that above.
5. The eggs are protected from drafts.
6. The eggs are cooled once or twice daily.
7. The temperature within the cabinet is raised each week as the hatch progresses.
8. Moisture is conserved by restricting air movement. All air entering the incubator passes through the cabinet once and is exhausted to the outside.
9. The eggs are turned frequently by rolling or shuffling.

Smith revolutionized the whole theory of incubation. He broke away from the prior art:

1. By having eggs in various stages of hatching within the same incubator.
2. By arranging the eggs at different levels.
3. By applying heat to all sides of the eggs.
4. By having the air below the eggs the same temperature as that above.
5. By applying a forced draft of air over and about the eggs constantly.
6. By not cooling the eggs once or twice daily.
7. By not changing the temperature of the cabinet as the hatch progressed.
8. By not restricting air movement to conserve moisture, but by arranging the exhaust openings so that only a small amount of air is exhausted while the main body of air is forced through the cabinet over and over again in repeated cycles.
9. By tilting the eggs on their small end to effect the turning.
10. By utilizing the heat of the eggs in advanced stages of hatching to help incubate the eggs in the earlier stages.
11. By utilizing the heat absorbing properties of the eggs in the first ten days of hatching to help cool more advanced eggs.

The Jamesway Incubator follows the teachings of Smith using the same identical steps:

1. By having eggs in various stages of hatching within the same incubator.
2. By arranging the eggs at different levels.
3. By applying heat to all sides of the eggs.
4. By having the air below the eggs the same temperature as that above.
5. By applying a forced draft of air over and about the eggs constantly.
6. By not cooling the eggs once or twice daily.
7. By not changing the temperature of the cabinet as the hatch progressed.
8. By not restricting air movement to conserve moisture, but by arranging the exhaust openings so that only a small amount of air is exhausted while the main body of air is forced through the cabinet over and over again in repeated cycles.
9. By tilting the eggs on their small end to effect the turning.
10. By utilizing the heat of the eggs in advanced stages of hatching to help incubate the eggs in the earlier stages.
11. By utilizing the heat absorbing properties of the eggs in the first ten days of hatching to help cool more advanced eggs.

JIT. 2/20/14

RECORD COVERING GROSS SALES OF FORCED DRAFT INCUBATORS

YEAR	ROCKUP NUMBER UNITS	ROCKUP VALUE	ROCKUP EGG CAPACITY	SMITH NUMBER UNITS	SMITH VALUE	SMITH EGG CAPACITY	COMBINED SMITH AND ROCKUP NUMBER UNITS	COMBINED SMITH AND ROCKUP VALUE	COMBINED SMITH AND ROCKUP EGG CAPACITY
1917	20	1,740.00	Not Known				20	1,740.00	
1918	105	28,962.96	" "				105	28,962.96	
1919	166	98,771.35	" "				166	98,771.35	
1920	215	217,718.85	" "				215	217,718.85	
1921	236	270,299.41	1,455,152				236	270,299.41	1,455,152
1922	557	654,497.13	4,470,384	1922 60	457,500.00	2,820,000	617	1,121,997.13	7,290,384
1923	707	725,847.66	5,727,648	1923 84	584,000.00	3,948,000	791	1,309,847.66	9,675,648
1924	845	775,017.75	6,059,052	1924 79	526,720.00	3,713,030	924	1,301,737.75	9,772,082
1925	1,156	1,247,299.49	10,979,382	1925 145	925,930.00	6,721,050	1,301	2,176,329.49	17,600,382
1926	1,369	1,690,042.15	15,639,700	1926 521	3,106,051.00	15,097,000	1,890	5,996,093.15	30,936,700
1927	1,450	1,795,458.26	16,255,308	1927 327	2,162,479.50	15,569,000	1,777	5,957,911.76	31,824,308
1928	613	669,984.44	6,059,382	1928 170	1,125,521.00	8,615,000	783	1,795,506.44	14,674,382
1929	1,040	1,312,297.27	12,734,382	1929 345	2,179,453.50	16,929,000	1,385	3,491,750.77	29,663,382
1930	619	838,765.77	7,778,412	1930 264	1,815,900.25	12,650,000	883	2,448,694.02	20,428,412
1931	765	997,418.36	9,988,810	1931 59	365,715.50	2,726,000	822	1,363,131.86	12,670,810
1932	297	279,905.81	2,139,270	1932 37	199,064.50	1,655,000	274	478,970.31	3,822,270
July 31 1933	83	77,452.00	823,872	August 31 1933	16 84,941.01	761,000	99	162,425.01	1,584,872
	10,400	11,908,550.61	100,144,256	1,905	12,318,094.26	91,033,000	12,305	24,226,624.87	191,177,256

PLAINTIFF'S EXHIBIT No. 23

992-994

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